3654

FOOD Manufacture

GRINDING AND SIZE REDUCTION

A PUBLICATION OF THE LEONARD HILL TECHNICAL GROUP

Vol. 36 No. 4 APRIL 1961

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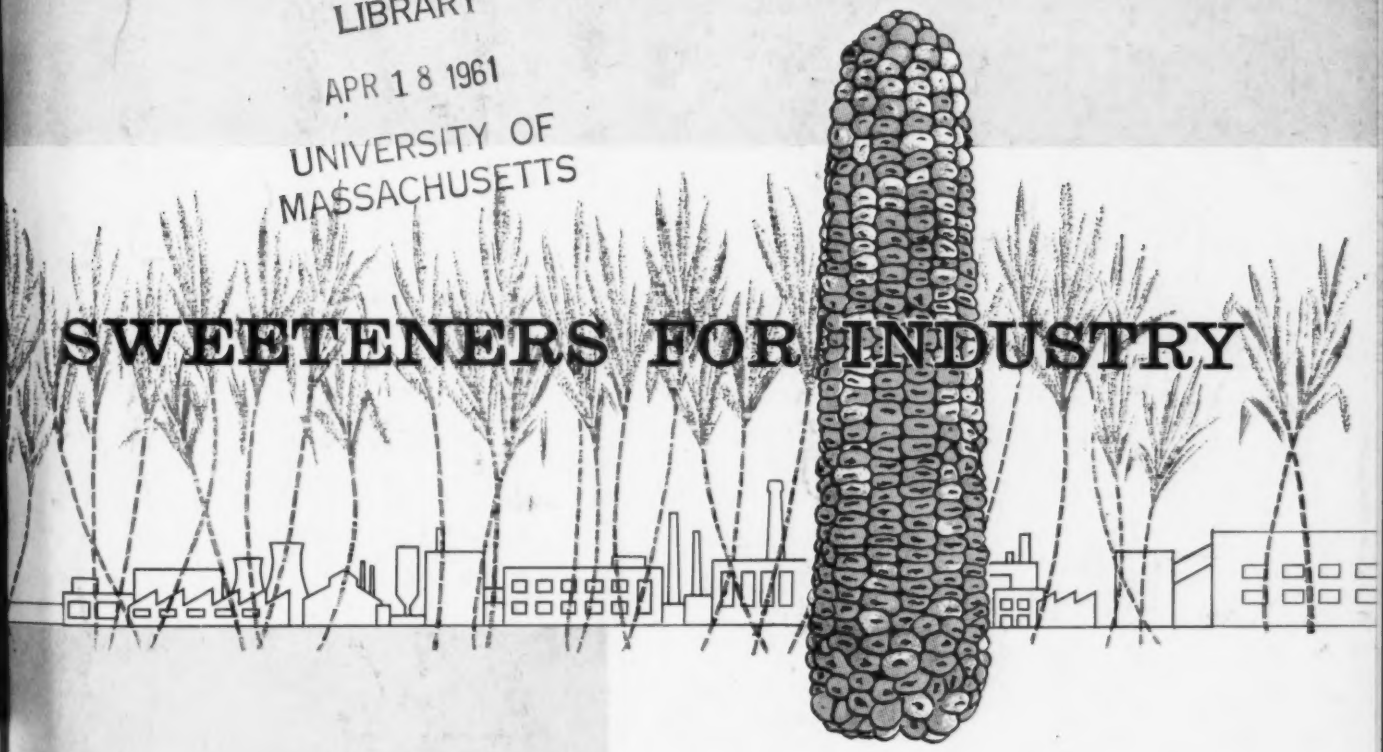

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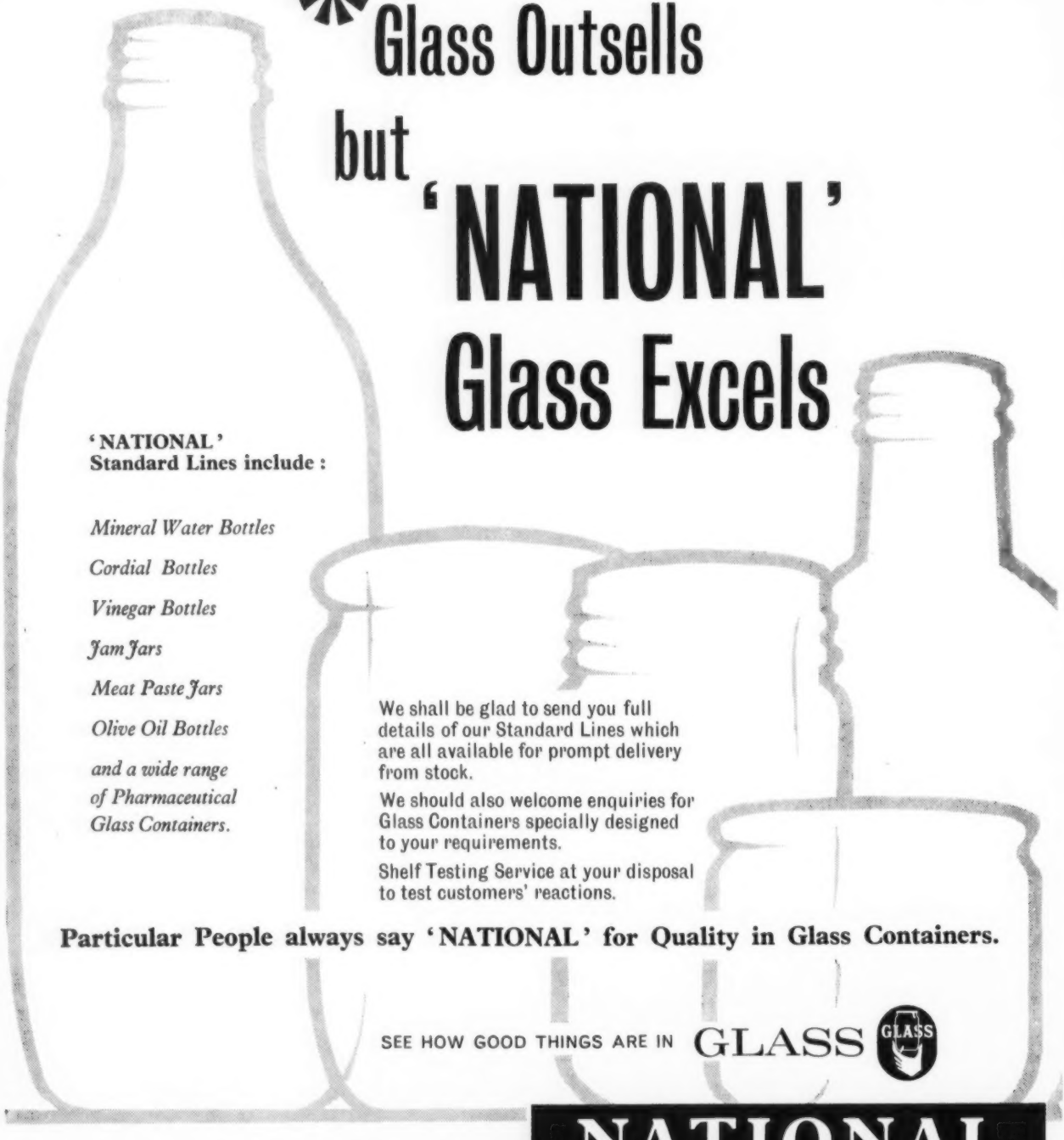

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**** Choose from a complete range of food processing machinery.***

Foodtech have the largest range of food processing equipment in the world, backed by expert, practical knowledge of factory layout and production methods. You can be sure of getting the right equipment and the best advice if you go to Foodtech.

The Foodtech Cut/Mixer

—high speed (1,000/4,000 r.p.m. as desired) heavy duty chopper and emulsifier. Accepts any kind of frozen meat or other materials, cuts cleanly into particles (coarse cut) or produces a smooth emulsion. Also chops and blends fruit, vegetables and butter. Bowl capacities from 20 lb. to 800 lb.

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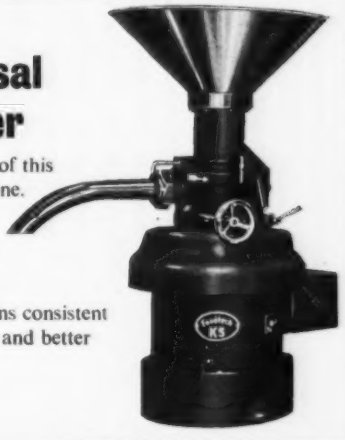

Over 200 satisfied users of this machine in the U.K. alone. Accepts all foodstuffs—even the toughest—and reduces in seconds to a smooth uniform mix that remains consistent for more binding power and better colour.

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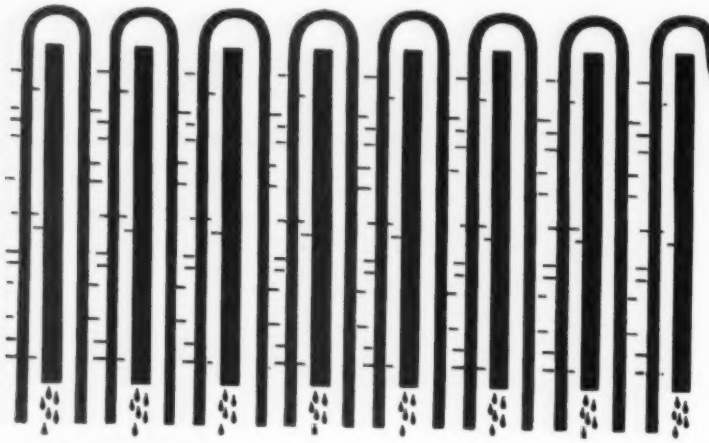

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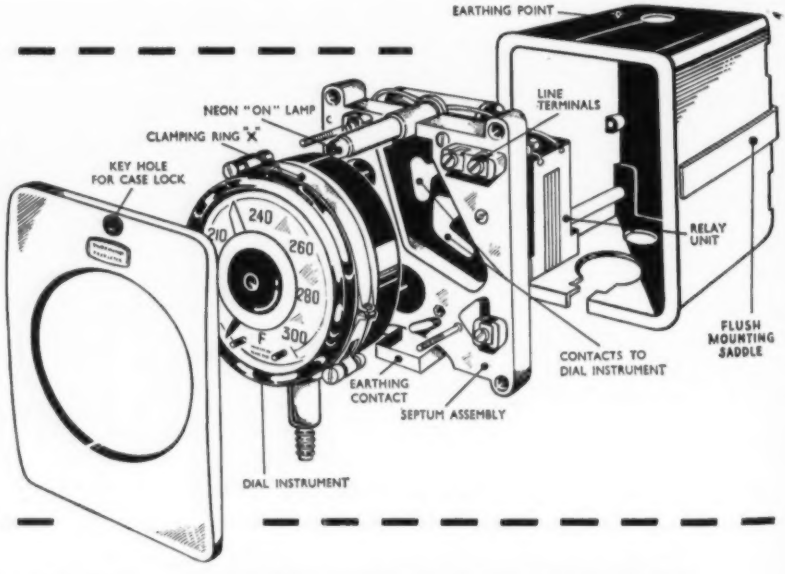

Most food cooking and cooling processes can be brought under control simply and economically by installing a Cambridge Thermometer Regulator (or Gas Regulator). The cost is certainly low when related to the cost of waste incurred when proper control is lacking, and the performance of this instrument is comparable with complex apparatus costing very much more. The illustration shows the simple and sturdy construction of the instrument, which consists of a Cambridge 4-inch dial thermometer with contacts (set with a key) and an associated relay unit.

This controller is completely self-contained and measures only 7½ ins x 5½ ins x 5½ ins. Yet it can incorporate a relay of not less than 20 amps capacity within the case. Installation is simple and involves the connections of only 5 wires at most to the mains supply and to the source of heat. A wide variety of bulbs to suit various applications is available. The modest cost of the Cambridge Thermometer Regulator brings *"control"* to the smallest manufacturer. *Write for List 276R. For future publications ask for Mailing Form R/4/61.*

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Roche Pure Vitamin C—

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- ✱ In *cured* meats, can significantly reduce curing time, give more uniform colour and help to maintain better colour and flavour during storage, distribution and display.

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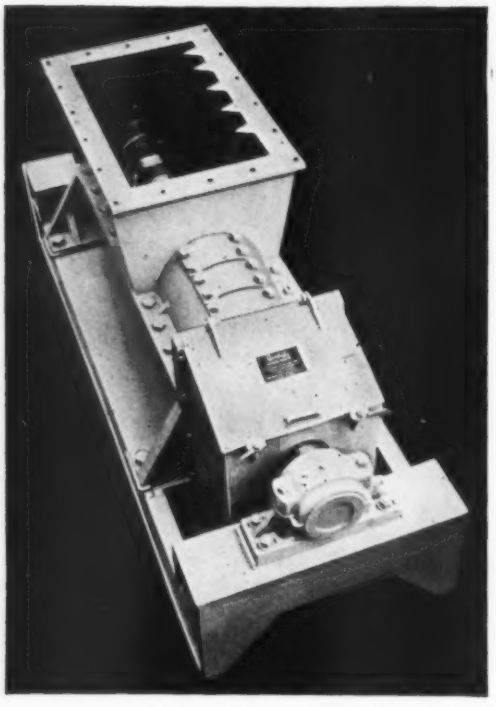
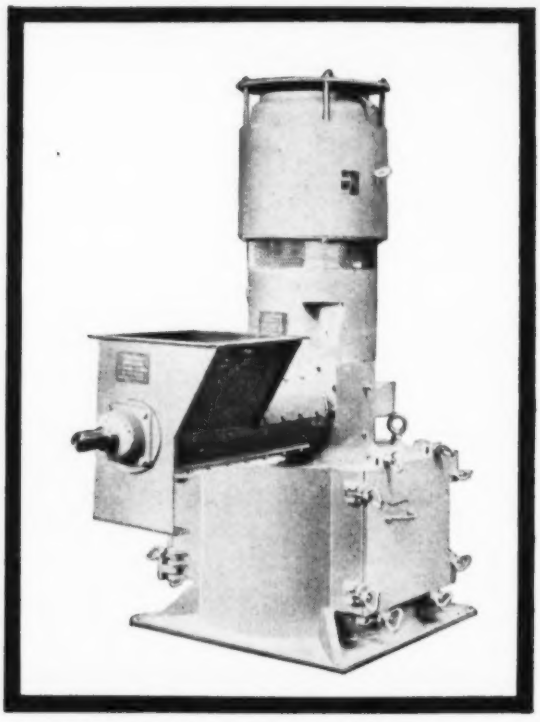
PREBREAKERS AND DISINTEGRATORS FOR SIZE REDUCTION



PREBREAKERS are heavy duty machines utilizing low torque and low speeds and are designed for heavy crushing, skin shredding, hogging, and pre-treatment of larger particles before disintegration. The material fed into the hopper is crushed by rotating hammers in conjunction with anvils fixed to the base of the trough. Advantages are eveness of product size giving maximum charge to cooker, and minimum process time, low power consumption, slow operating speed, high throughputs, minimum maintenance costs.



DISINTEGRATORS are heavy duty, high speed machines which produce uniform particle size from materials in the small or medium range. The input can be fine to coarse, wet, moist or dry. An integral prebreaker can be fitted as a feeder to give preliminary size reduction. A special feature is that maintenance is particularly easy and screens can be replaced very quickly when worn, or it is desired to change the gauge. The exclusive Scott-Rietz differential discharge enables resistant or tramp materials to be automatically separated from the product.

Advantages are even size of product, minimum operating costs, easy access to the machine and special differential discharges for tramp material.

Scott-Rietz machines are manufactured in Great Britain under licence by George Scott & Son (London) Ltd.—one of the Balfour Group with its comprehensive Research and Development Centre.

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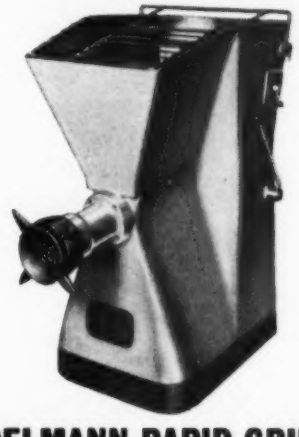
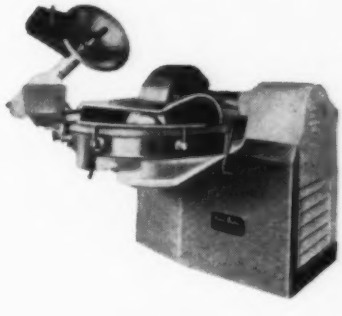


SEYDELMANN RAPID GRINDER

Grinds as fast as it can be loaded through large capacity stainless steel hopper. 12½ H.P. 3-phase motor 130 m.m. knives and discs. A really high-speed machine—used by leading sausage manufacturers throughout the world.

TOWNSEND DE-RINDER

Does the work of from 8 to 10 hands, de-rinding every kind of cut of pork without preparatory knife-work. No skill needed to operate.



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Meat, large or small, frozen, chilled or soft is cut with speed and precision. Specially positioned narrow knives reduce friction to a minimum, thereby keeping the product cool No other machine saves so much time and labour.

YOU ARE INVITED to send for full specifications of these machines. Demonstrations will gladly be arranged

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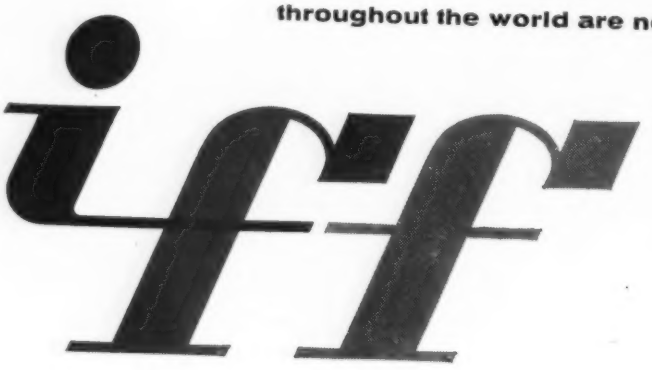

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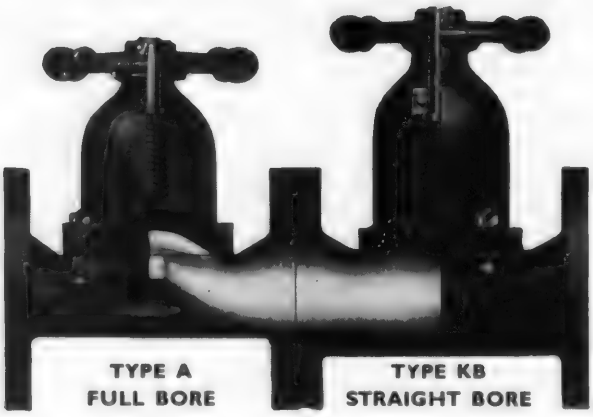
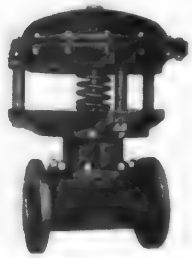
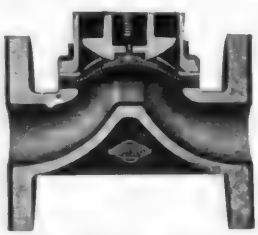


So many Saunders Valve variants for so many Food Manufacturing duties

Handwheel operated versions of these diaphragm valves for normal handling of difficult fluids encountered in food manufacture. Chainwheel operation for many inaccessible locations such as overhead pipe lines. Small models for laboratory and kindred duties but still having the same sure closure and isolation of mechanism so valuable in the larger types. For quick action, Lever Operated valves are supplied to many establishments and, where remote or automatic control is essential, one or another of the Power Operated models is specified. To suit the more exacting duties, hundreds of these valves are supplied with Stainless Steel Alloy or Plastic Bodies, or with bodies lined with rubber, glass, lead, nylon, or titanium. For use in some vacuum conditions Sealed Bonnets are fitted.



Food Manufacturers are aware of the wide range of diaphragm grades available and take full advantage of this for coping with edible fluids and the fluids encountered in research and processing.



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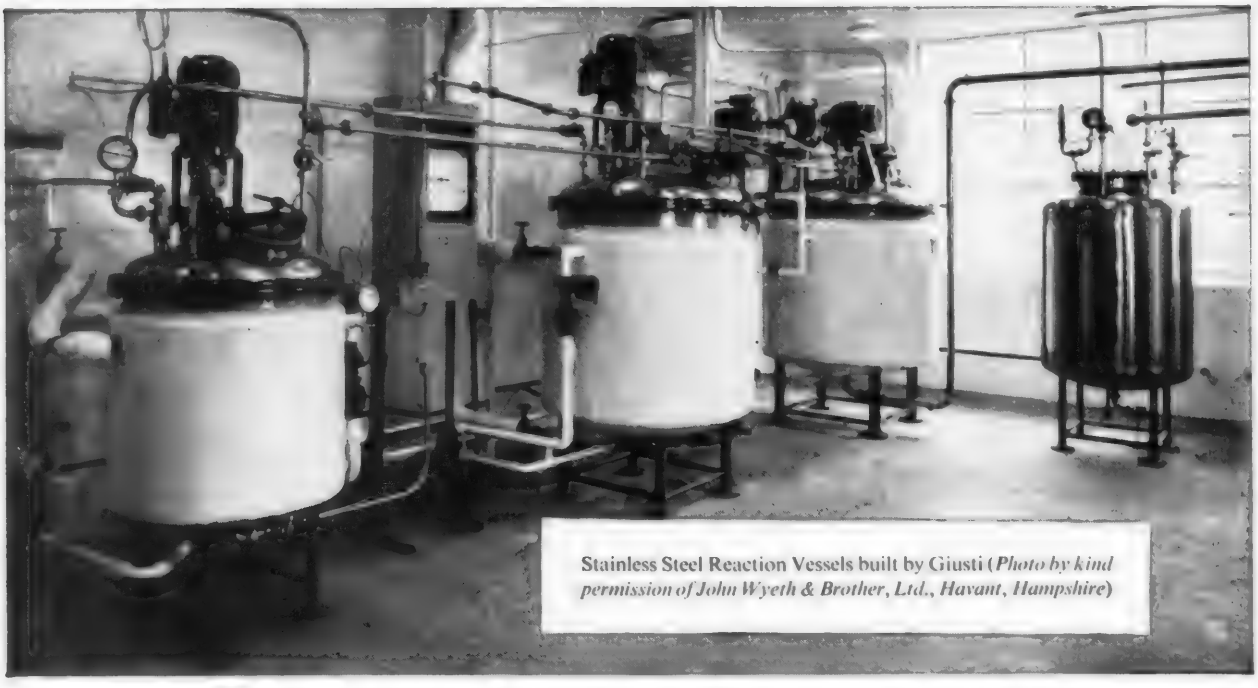

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A recent photo of stainless steel sterilizers made by Giusti and supplied to the M.W.B. Bacteriological Laboratories 25 years ago. (*Photo by courtesy of the Metropolitan Water Board*)

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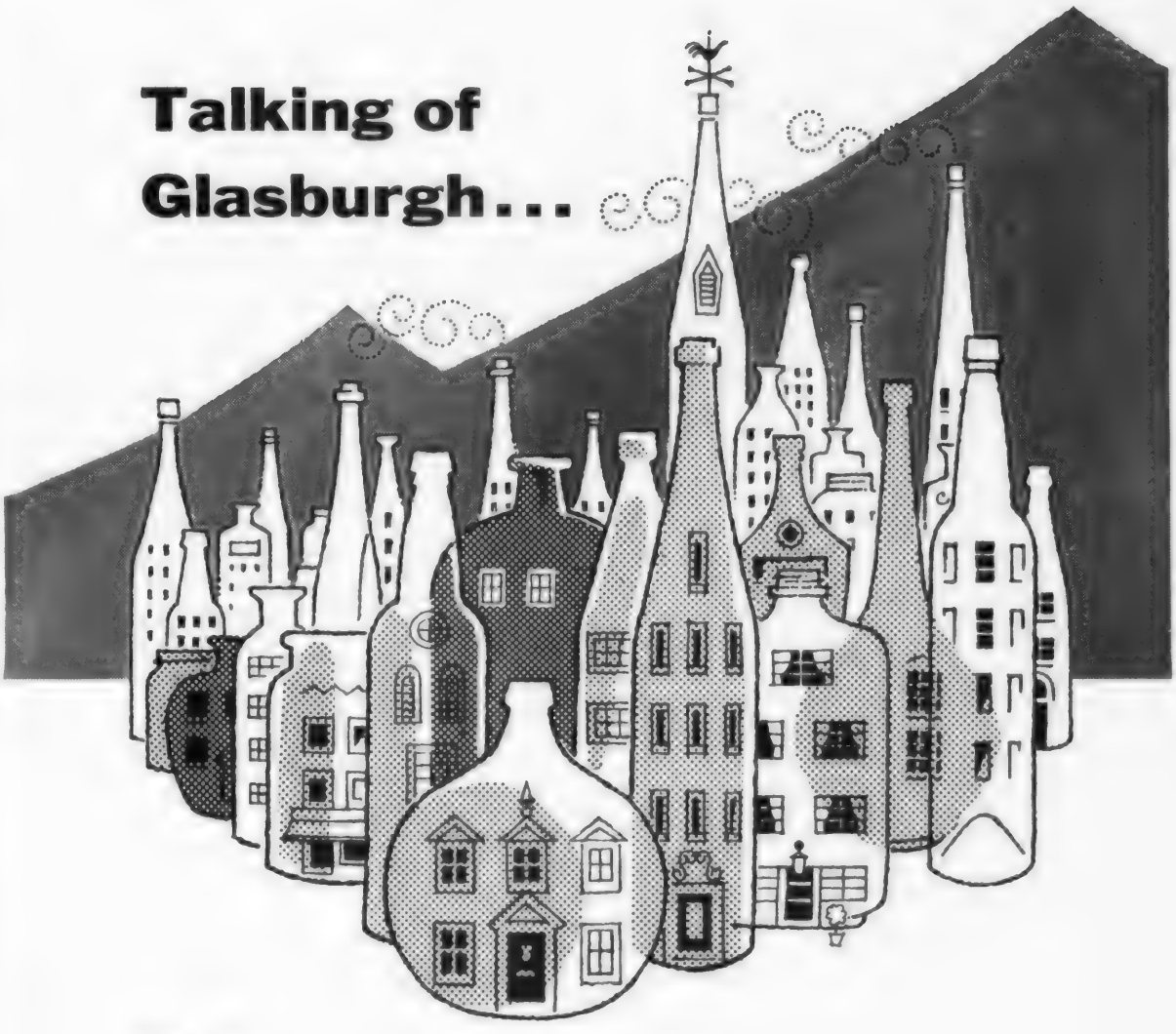

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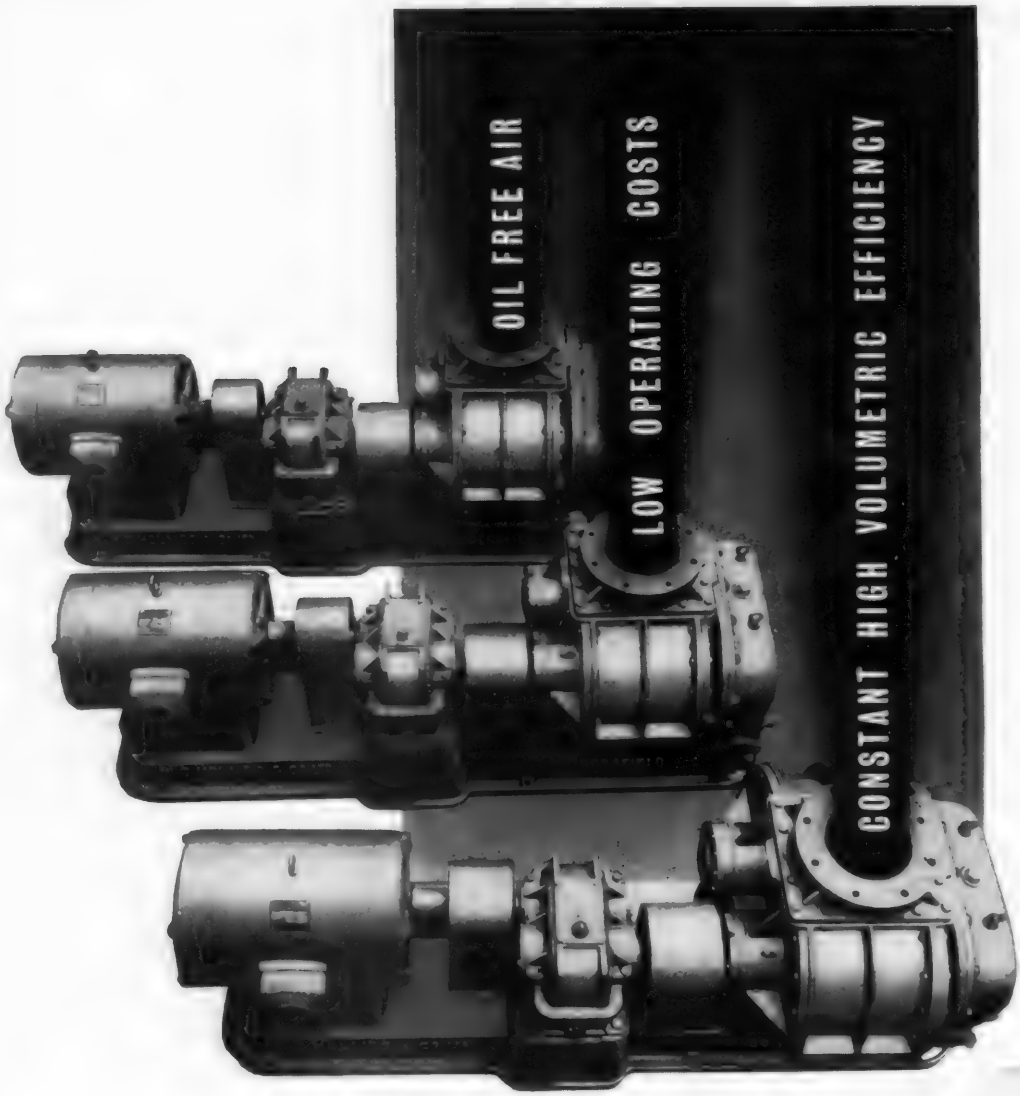

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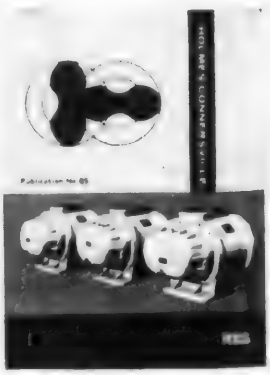

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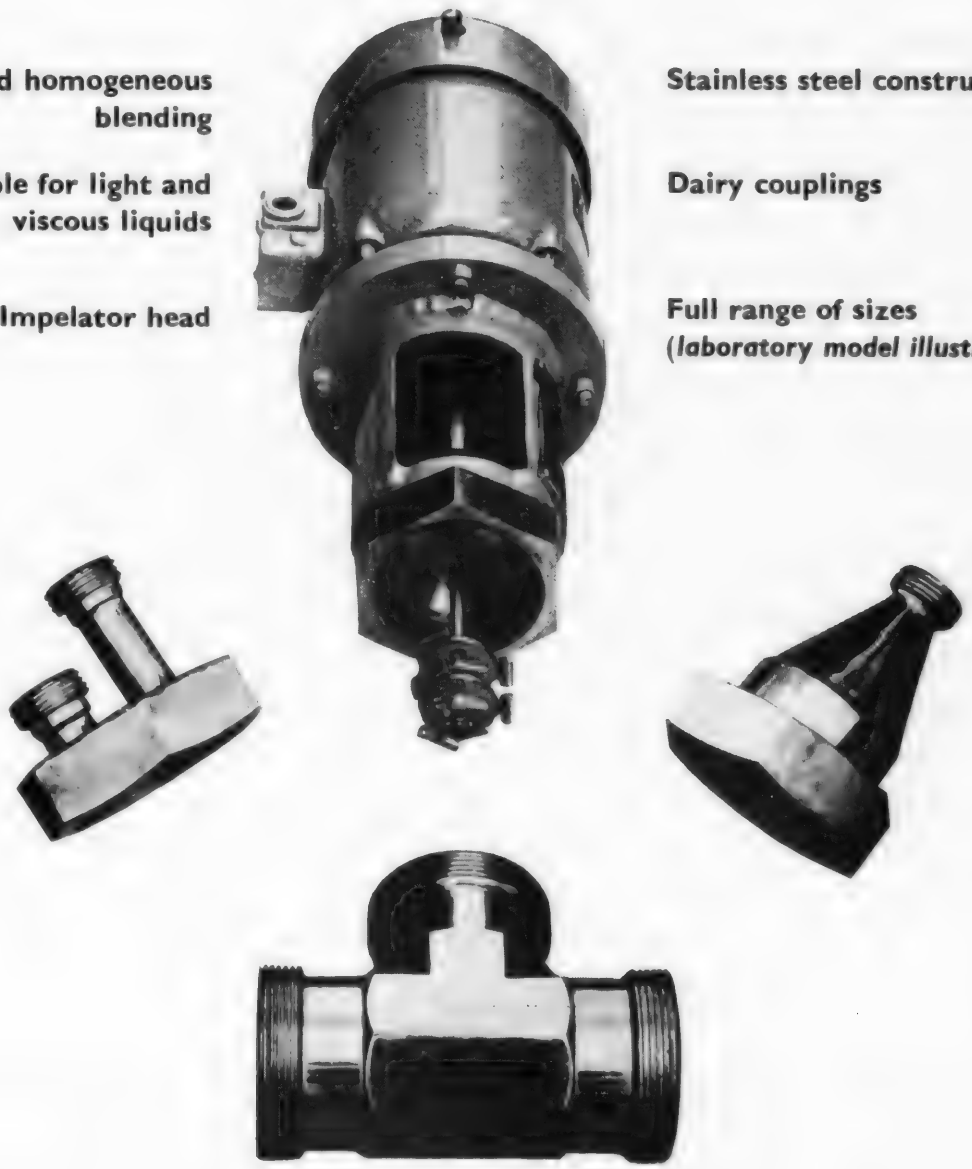

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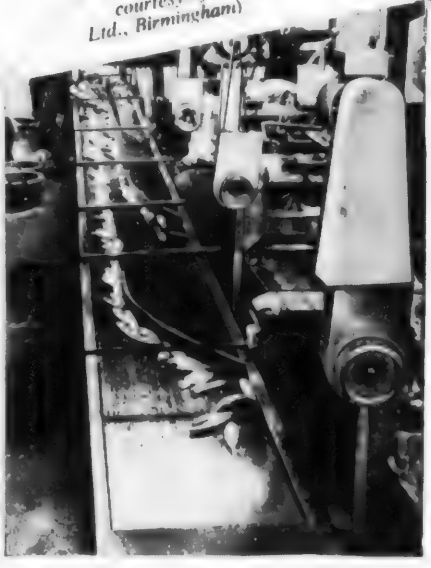
Cake packing on a 'Motaveyor' (by courtesy of Knightsbridge Cake Limited, Manchester)

Fruit bottling on a 'Motaveyor' conveyor (by courtesy of J. Mawdsley Ltd., Wigan)



Scandura conveyor in a fish canning factory (by courtesy of Fisher & Ludlow Ltd., Birmingham)

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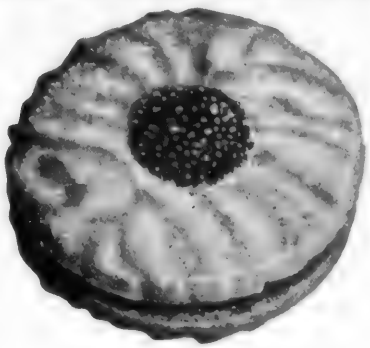

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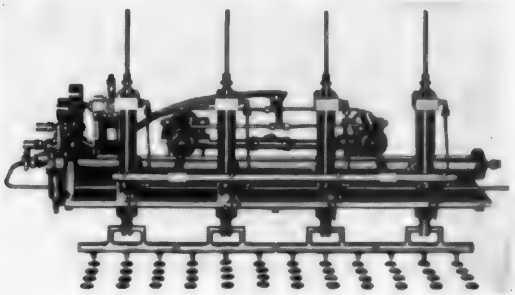

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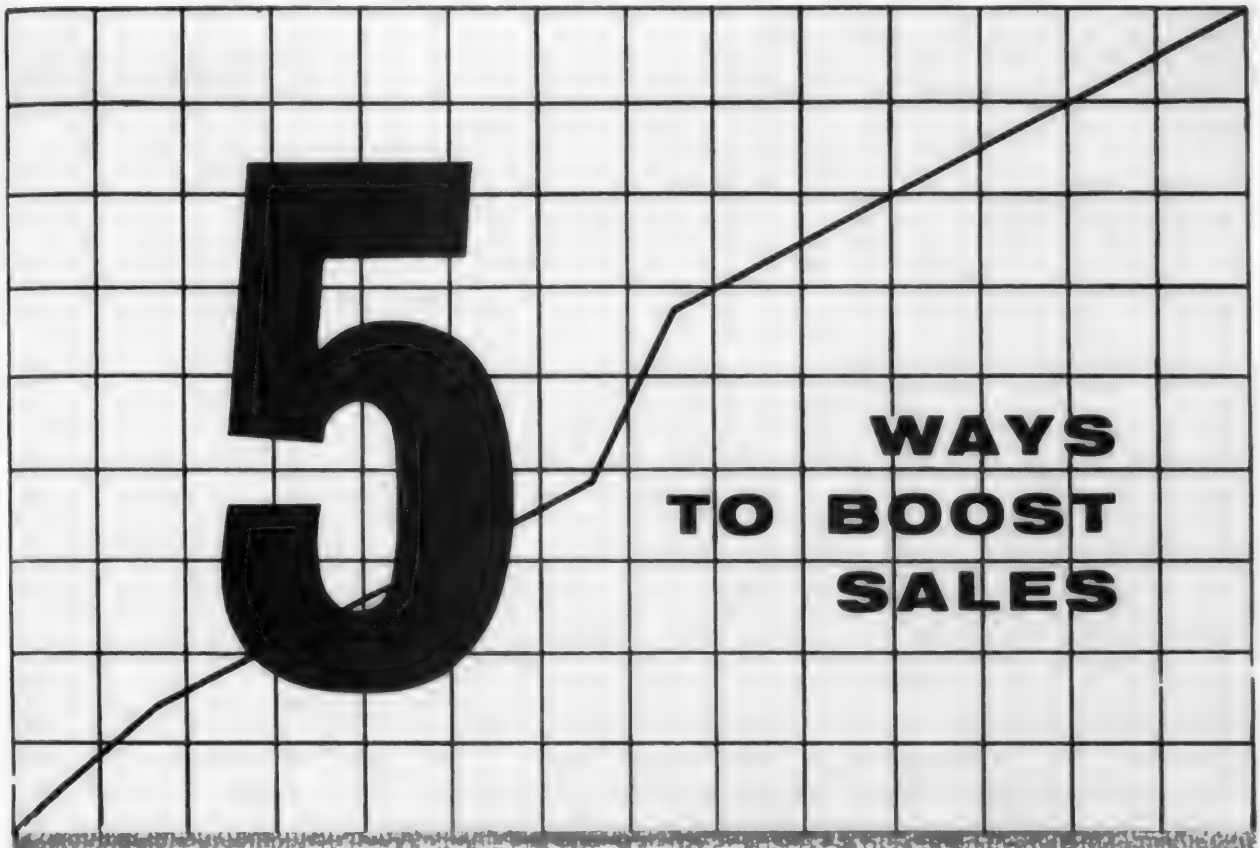

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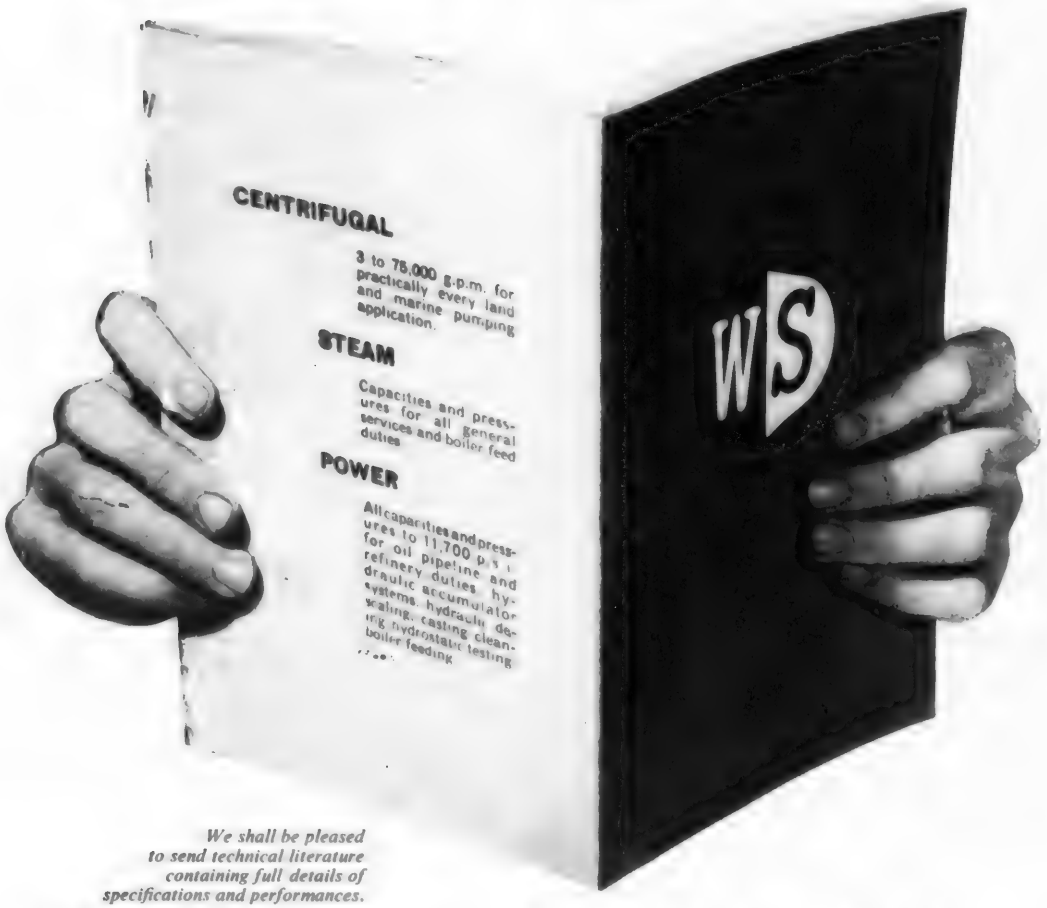
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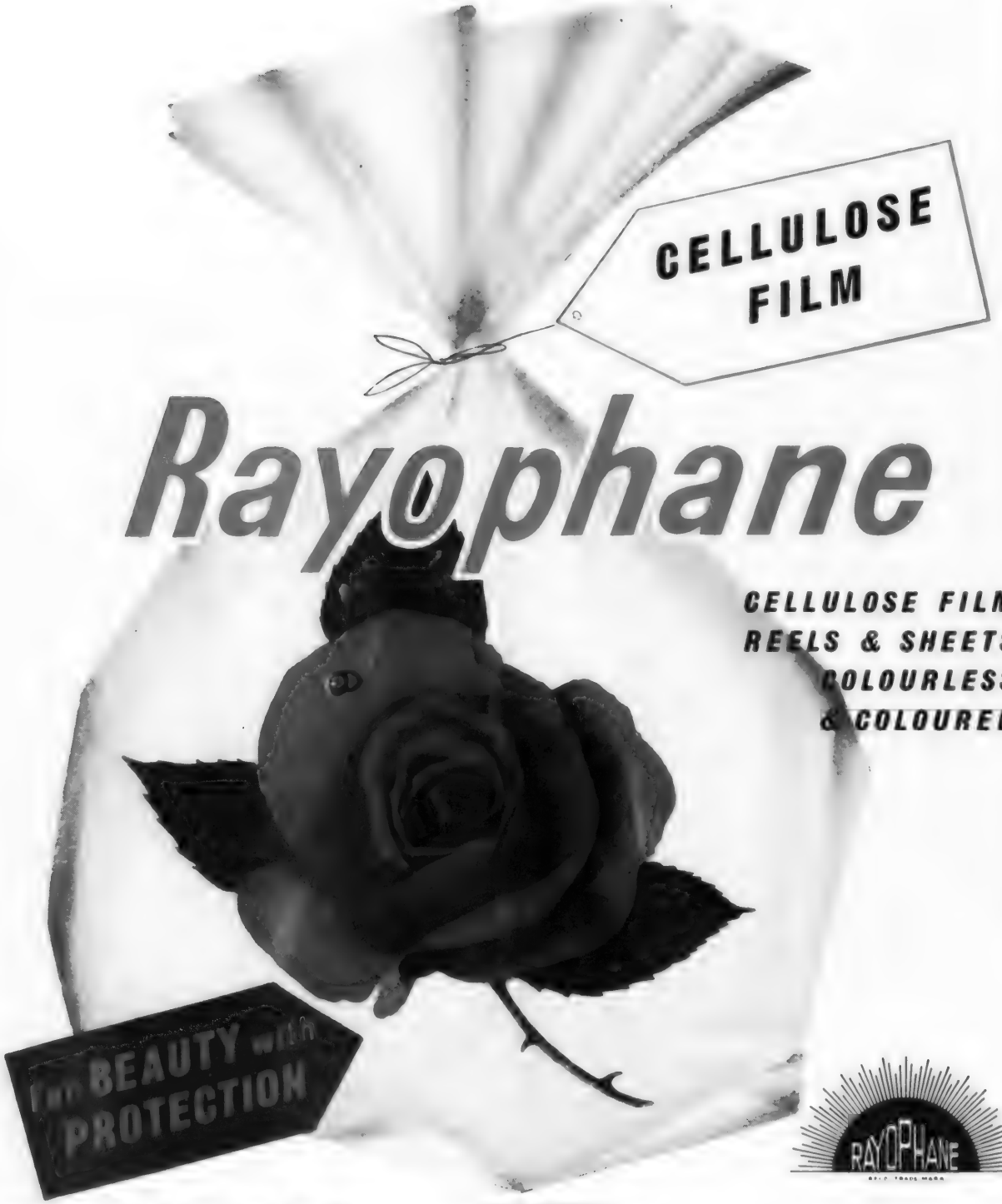

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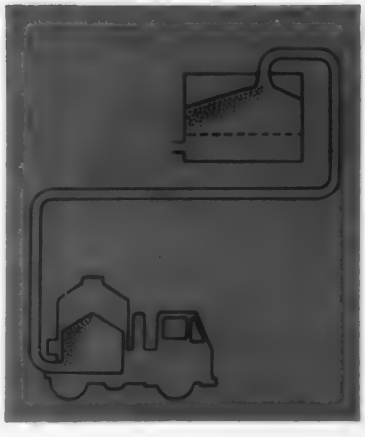

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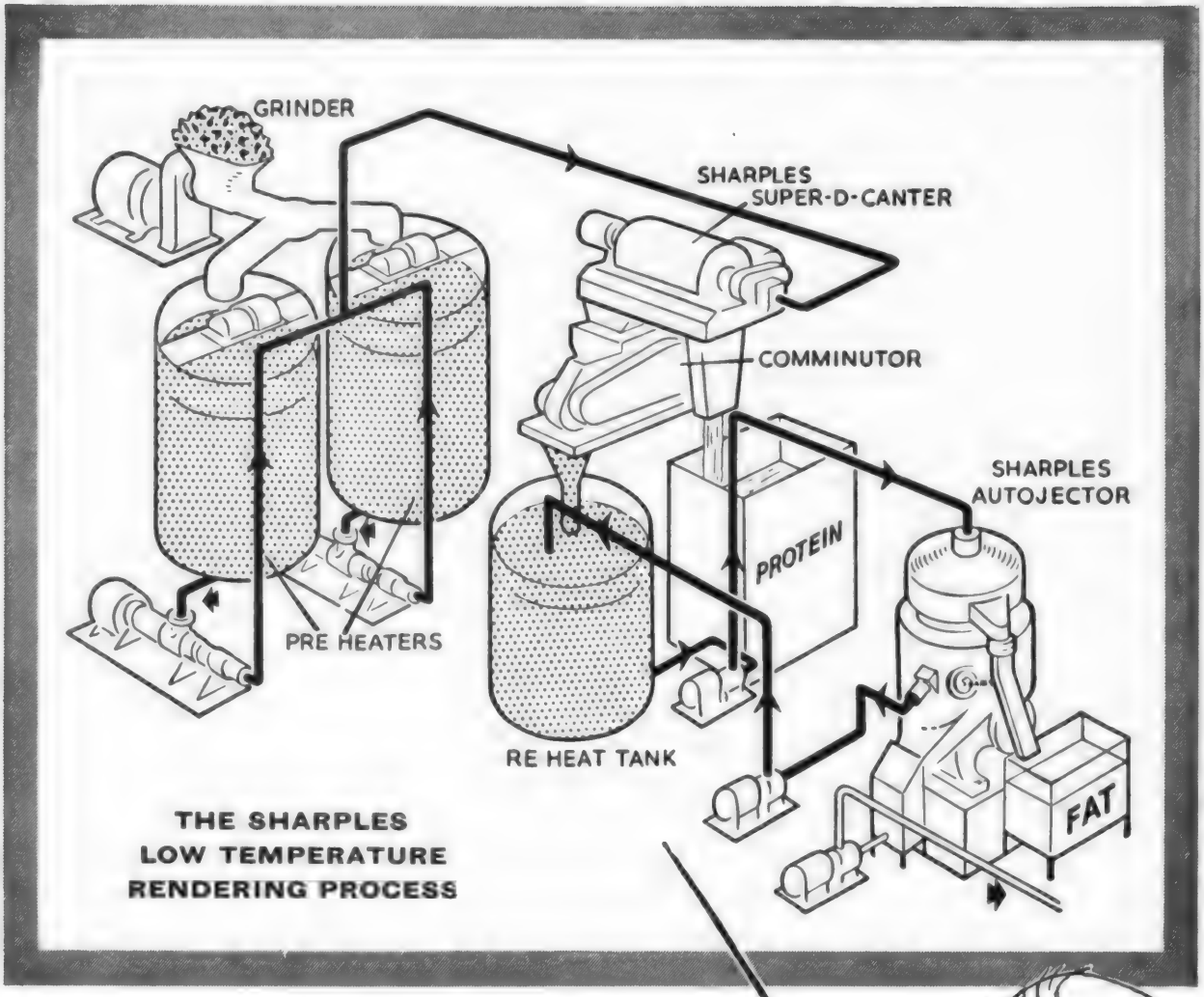

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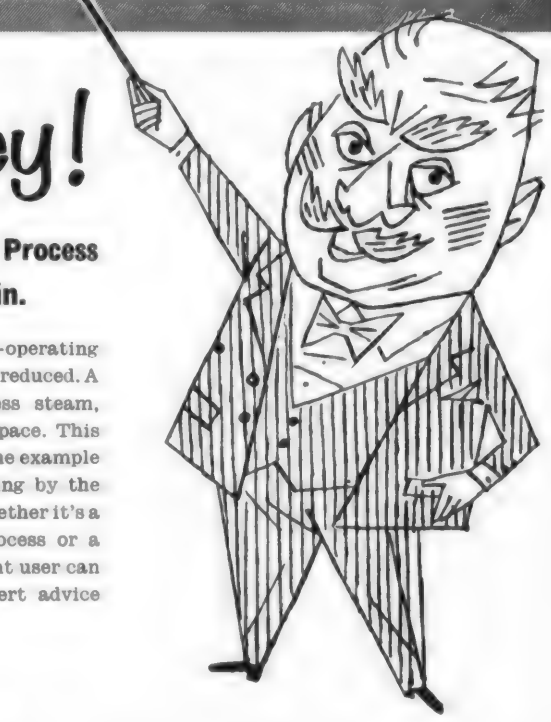

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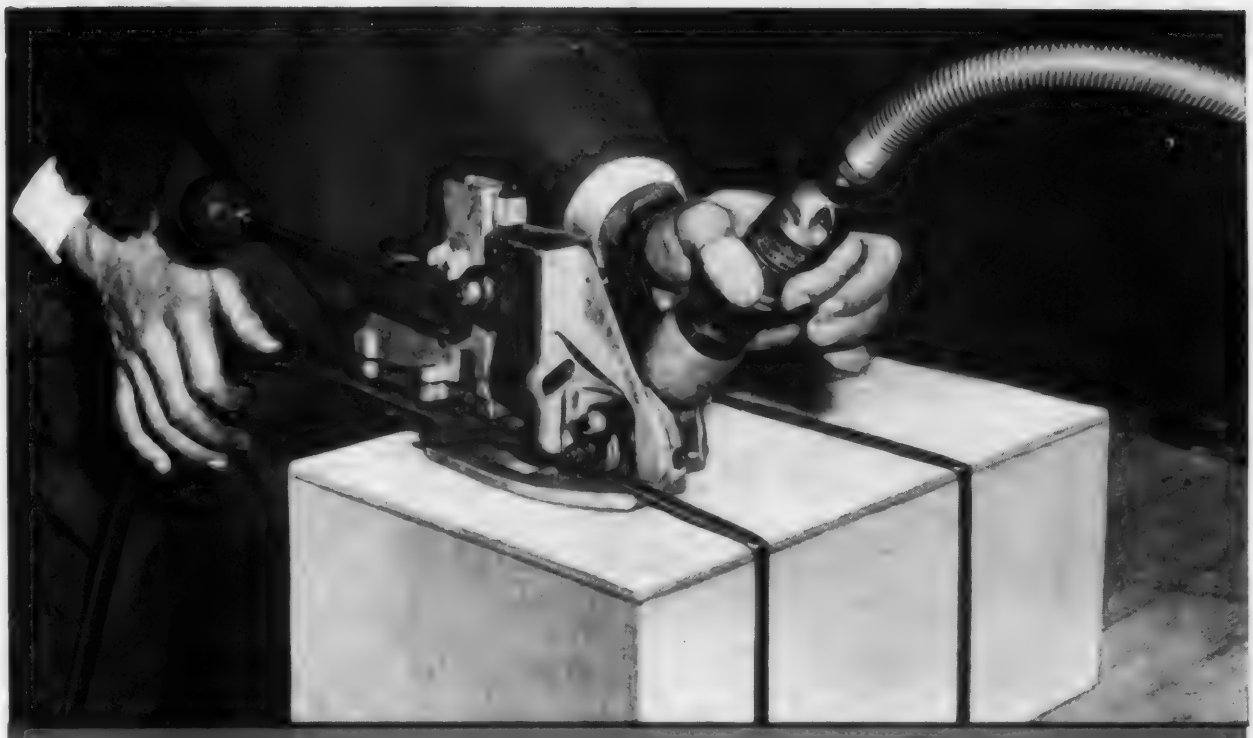

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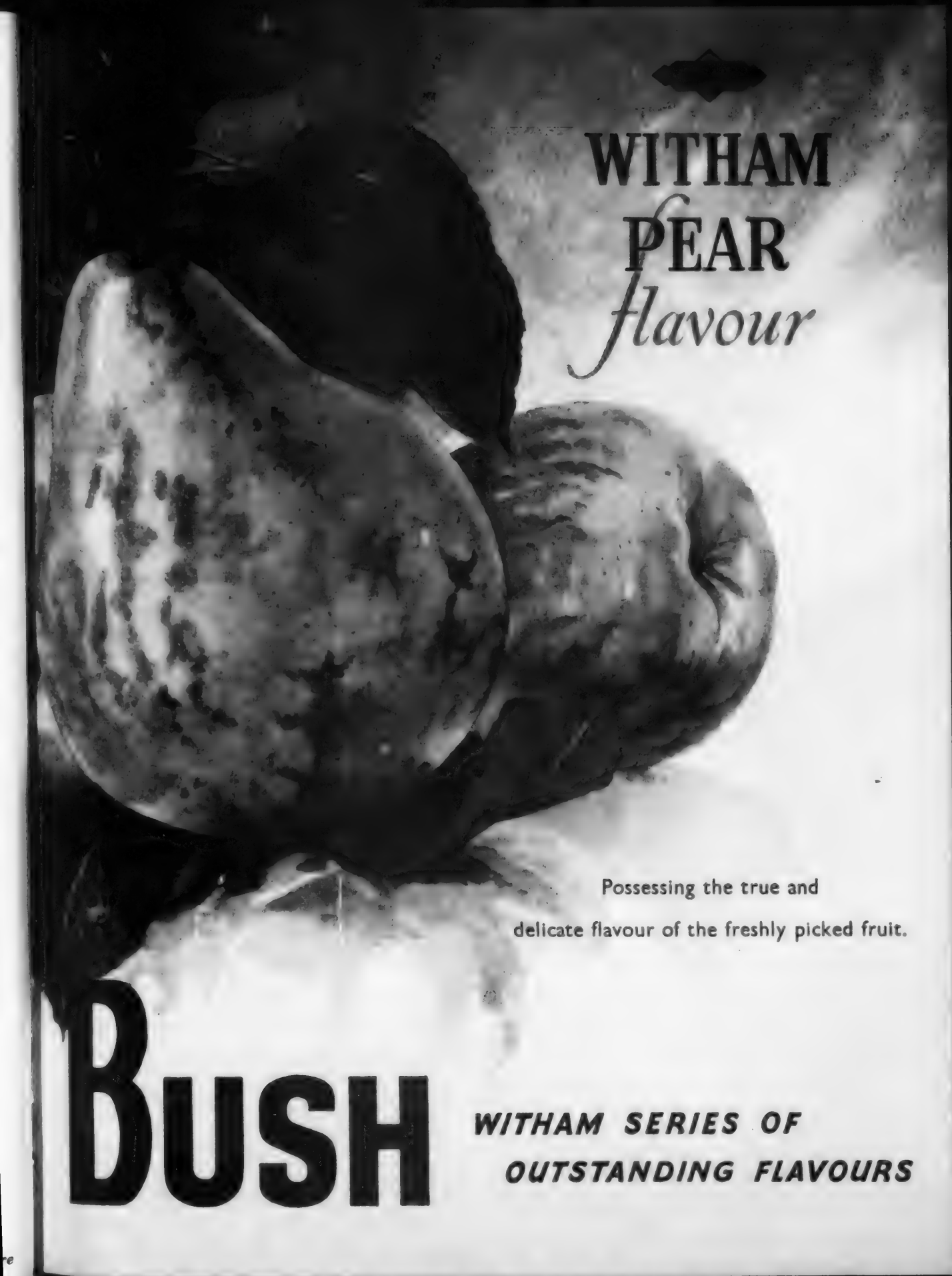

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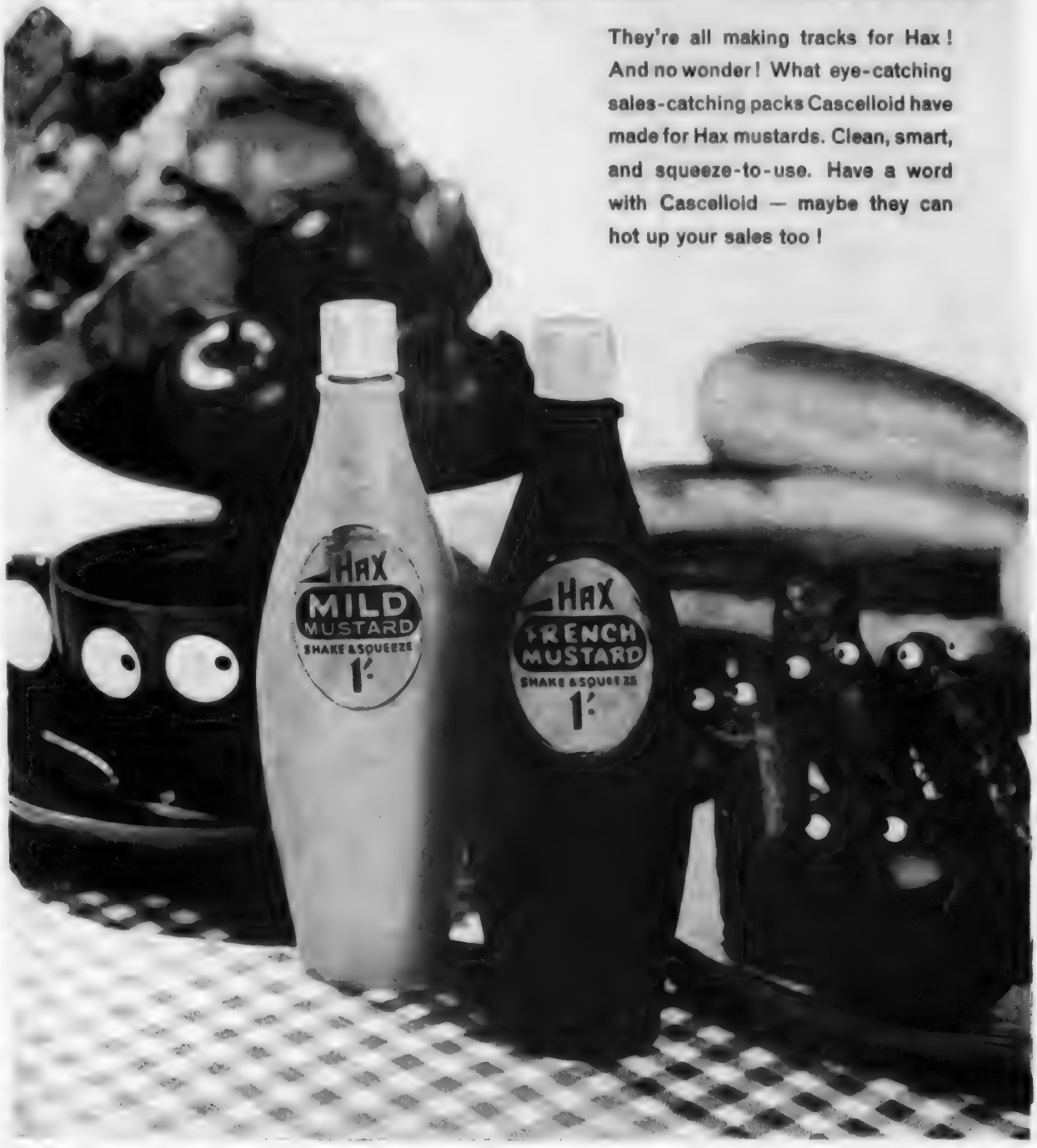

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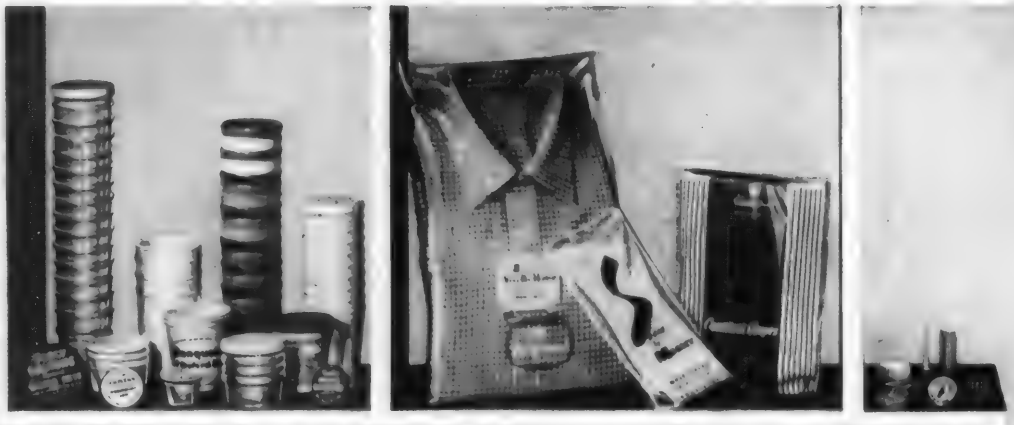

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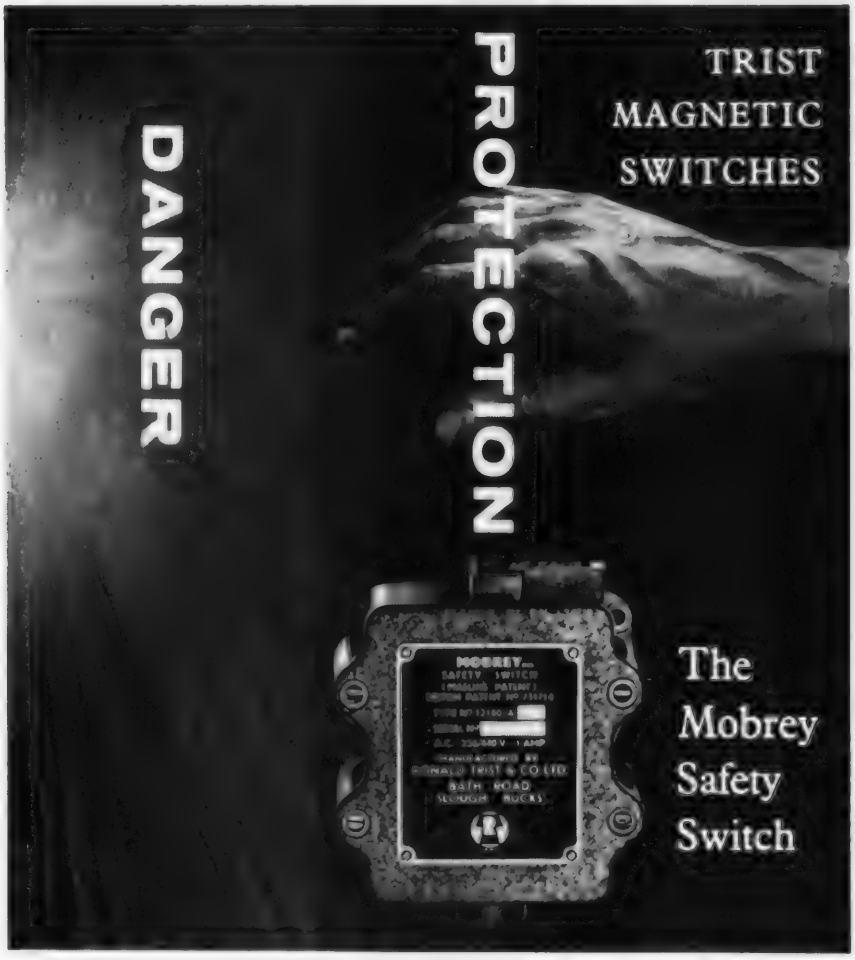

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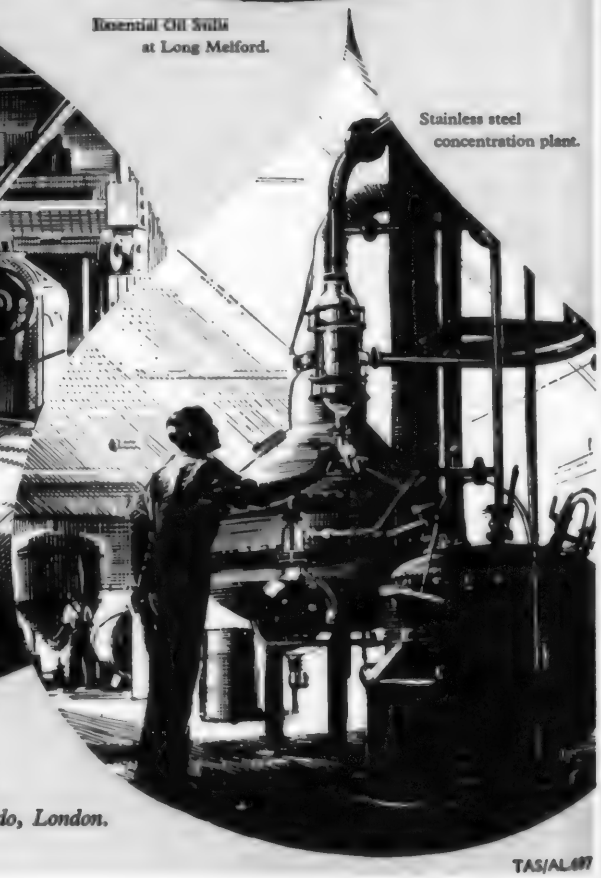

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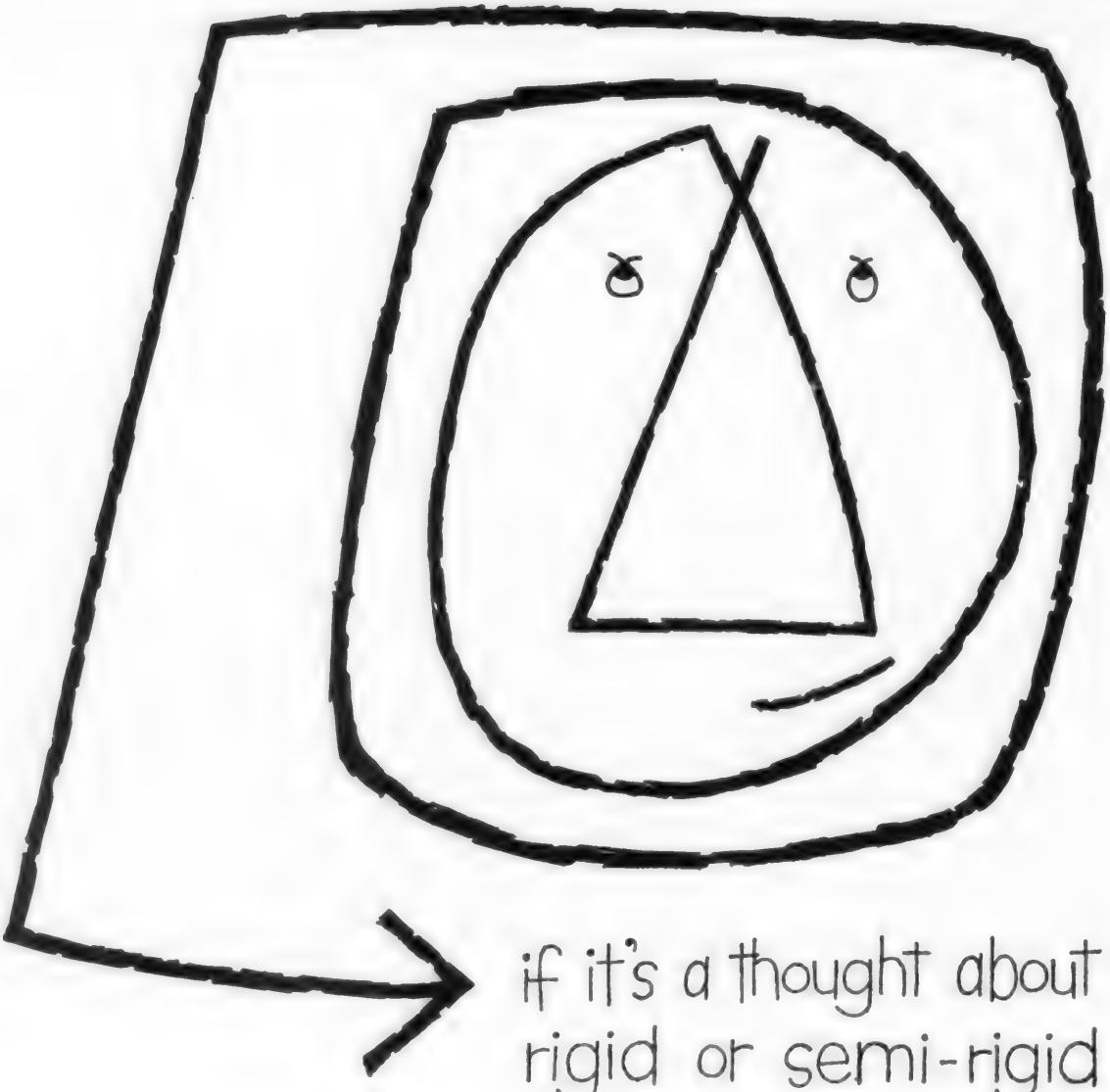

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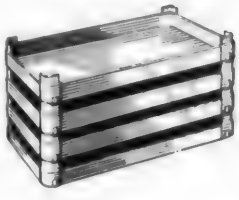

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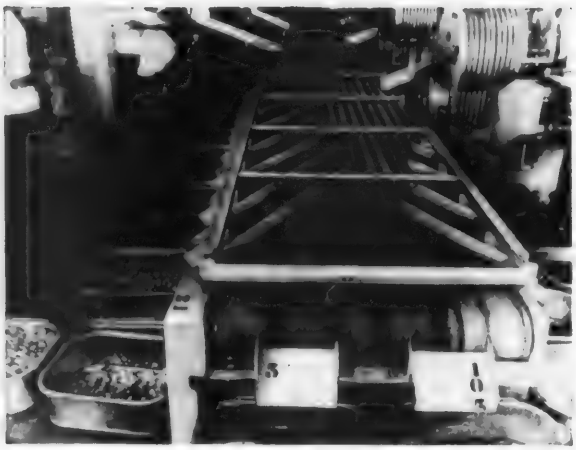

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FOOD
Manufacture

Volume 36. Number 4 Editor: Anthony Woollen, B.Sc., A.R.C.S., A.R.I.C. April 1, 1961

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Number 32 April 1961

The Handling & Storage of L. & N. Products (No. 1)

LODERS and NUCOLINE LTD.

INFORMATION BULLETIN

This advertisement is one of a series of Information Bulletins issued by Loders & Nucoline Ltd. Copies are available, together with a folder, on request to Loders & Nucoline Ltd., Unilever House, London, E.C.4.

Oils and fats are among the most expensive raw materials used by the manufacturer. It is, therefore, well worth taking that little extra care in both handling and storing these commodities and, as manufacturers and suppliers, we offer the following suggestions.

Fibreboard Containers

Fibreboard containers are especially designed to withstand rough treatment during transit, but reasonable care should always be taken when loading and off-loading these containers.

On arrival at the user's premises, the containers should, if possible, be unloaded under cover, especially if weather conditions are unfavourable.

Fibreboard containers should always be stacked in a cool store at a temperature, if possible, of less than 60°F and a free circulation of air should be maintained. Direct sunlight should not be allowed to fall on the containers. In order to assist free air flow, the packages should be stacked as openly as possible and not close to walls where dampness may occur. A concrete floor is easy to clean and helps to combat over-heating but, since it is prone to dampness, the containers should be stacked on duck-boards or, preferably, pallets.

Once a container has been opened, either for inspection or in order to use a portion of its contents, it is essential that any remaining fat should be protected by carefully replacing the packaging paper and then re-sealing the container with gummed paper. This will prevent invasion by moisture or vermin.

Drums

Most drums are returnable and should be treated with reasonable care, since excessive denting will make them unusable in future. Drums of oil or fat should be stored under cover, preferably indoors, on a hard standing. Ideally the store should be dry and cool (approx. 60°F or less). Make sure that containers with removable heads are left with lids uppermost and, before opening, clean around the rim so that no dust or dirt falls into the oil or fat when the covering is removed.

When the oil or fat is solid at normal storage temperatures, it is usual to remove it from the drum by completely melting with a steam-coil or electrical heater, or by conditioning in a hot room, or heating over a melting grid. In all cases, great care should be taken to make sure that local over-heating does not occur, since a temperature in excess of 125°F for extensive periods could be harmful to an oil or fat. If the above aids are not available, or if a material is required solid, it should be removed manually. The galvanised lining of the drums should not be scratched since it might flake off and contaminate the contents.

The head of a partially emptied drum should always be properly replaced so as to exclude air, the weather and any extraneous matter which might be harmful to the oil or fat.

Similar precautions regarding over-heating should be taken when the drum is to be emptied through the bung. Excessive heating is not only harmful to the oil or fat, but the resultant volume increase might well distort or even burst a drum. Prior to heating, the bung should be loosened slightly or removed. Care should be excercised when removing a bung from a heated drum since pressure may have built up, thereby causing hot oil to be ejected when the bung is removed.

Note

If correctly stored, oil and fats in fibreboard containers or drums should remain pure and fresh for several months. However, all oils and fats are perishable and we recommend that, after long storage, a careful examination should be made before use. Once the oil or fat is removed from the container it should be processed as quickly as possible.

These suggestions have been necessarily brief and further advice will be given on request to Loders & Nucoline Technical Service Department.

FOOD Manufacture

Vol. 36, No. 4 April 1, 1961

The "breakthrough" that never was

THIS term "breakthrough" intrigues us. "Major breakthroughs" impinge themselves dramatically on us almost daily. Medicine and space seem to be the most popular hunting grounds of "breakthroughs," and of course our American friends use the term more frequently than anyone else. The term has even crept into the sedate columns of *The Times*, who recently reported a "major breakthrough" of aluminium into the can market in the U.S.A., especially in connection with the citrus concentrate industry. Other journals have taken up the story; indeed, we get the impression from one or two of them that the days of the faithful tin can are numbered, and that the tinplate interests are quaking in their shoes.

This is slightly exaggerated. Firstly, the reports that citrus canners in the U.S.A. have gone over in a big way to aluminium cans are certainly premature. Secondly, there is an embarrassing surplus of aluminium in the U.S.A. and it would be very convenient for some people if some of the surplus could be diverted to canning. This has led to some wishful thinking.

Coming nearer home, what are the prospects for aluminium as a canning material in this country? On the face of it, not very bright. As in every other sphere, the fundamental criterion is cost, and at the present time aluminium cannot compete economically with tinplate for normal canning purposes. True, there are certain fields, notably aerosols, where extruded aluminium containers are proving their worth, but as far as the food industry is concerned these fields are very limited. An exception is the fish canning industry, where a lot of aluminium cans are used, particularly in U.S.A. and Scandinavia, but the flat shape of the cans make them particularly suitable for this material.

Then there are technical difficulties. Aluminium is not so easily worked as tinplate and the obvious way to make an aluminium can is to extrude it rather than to seam it. This means more expensive machinery and different can-making techniques; even if aluminium were suddenly to become economically competitive with tinplate, it is going to take a very long time before sufficient of the new machinery is made and installed to make a real dent in the industry. How come, therefore, the term "breakthrough?"

Nevertheless, new developments are going on all the time. The canning industry of this country is one of the oldest sections of the food industry but its youthful vigour and freshness of outlook is remarkable. We have no doubt that when the time comes it will take aluminium in its stride, and that those who want aluminium cans will certainly be able to have them.

What about the earthworms?

AN ENTERTAINING correspondence in *The Lancet* started when Dr. Hugh Sinclair stated in a television interview that "there are good and bad chickens. I am in favour of the backyard hen, but I am not so certain about the broiler and the battery-fed hen." He implied that methods of poultry husbandry have a direct bearing on the dietary value of eggs, and that farmyard hens lay eggs containing more of the essential fatty acids which, he claims, are of value in preventing atherosclerosis.

This brought a reply from Dr. Coppock of Spillers and his co-workers who have been using gas-liquid chromatography to analyse the lipids of eggs from hens of similar breed "housed under different conditions and receiving diets appropriate to the environment." Both battery and free-range eggs have been studied. They came to the conclusion that there is little significant difference in the contents of essential fatty acids between free-range and battery eggs sampled at the same time during the laying period, and that seasonal variations within each group are much greater.

There is evidence, Dr. Coppock's letter went on, that there is a relation between the E.F.A. content of eggs and of the diet of the hens. Their studies lead to the implication that the E.F.A. are slightly more effectively transferred to the egg in the case of battery birds.

Dr. Sinclair in his reply said he wondered how Dr. Coppock collected the natural diet of farmyard

hens, containing as it does among other things, insects and earthworms. We feel he may have a point here, but two things emerge from the correspondence: (1) the significance of the slight differences between farmyard and battery eggs in the human dietary set-up is too uncertain for any dogmatic statements to be made; and (2) the dragging of eggs into the already overburdened atherosclerosis controversy should be strongly resisted.

A wasp in a cherry slice

THE BRITISH Baking Industries Research Association at Chorleywood has sent us a delightful snippet about a baker who was prosecuted for selling a cherry slice containing a wasp. It was alleged that the wasp rendered the food unfit for human consumption under Section 8 of the Food and Drugs Act, 1955.

This section is generally considered to refer to putrid or decomposing food or food containing foreign matter likely to be toxic. The prosecution held that the wasp was liable to be injurious, especially as it may have been carrying harmful bacteria.

The Research Association got to work. A literature survey indicated that wasp venom would not survive the baking of the cherry slice; this was confirmed by the failure of an attempt to "sting" a member of the staff with a baked wasp. The part of the cherry slice immediately surrounding the wasp was unaffected in appearance, odour and flavour, and this was considered strong evidence that the wasp would not have rendered the food unfit.

It was important to establish that a cooked wasp would not be unfit for consumption, and here the Natural History Museum were roped in. A glance round the more exotic delicatessen shops of our big cities reveals that a flourishing trade in cooked insects exists; such delicacies as chocolate covered bees and seasoned bumble bees (both are actually Japanese wasps, some complete with stinging apparatus) are evidence that some members of the wasp tribe are harmless at least. It is clear therefore that a wasp baked in a cherry slice cannot be regarded as injurious to health.

On the point that the wasp might have been carrying harmful bacteria, no evidence was put forward to show that such organisms would have survived baking. The magistrates accordingly agreed with the defence submission that there was no case to answer. The defence might not, however, have got away with it had the prosecution been brought under Section 2 of the Act, one of the commonest infringements being the presence of extraneous matter.

New angle on haymaking

HAY, the farmer's traditional winter fodder since mankind first started keeping cows, has until recently been largely taken for granted. The first requirement is that the material must be quite dry before being put into storage, otherwise fermentation and heating take place. Nowadays there are a number of widely used mechanical devices for speeding up the air drying process, but haymaking could be revolutionised if a chemical drying agent could be found. No such agent has yet been discovered, but recent work in Australia suggests that a suitable desiccant may eventually be found. Treatment with a new selective herbicide, ethylene dipyridilium dibromide, at the rate of 8 oz. per acre considerably reduced the drying time of mown material.

The main problem in connection with hay conservation is to minimise loss of valuable nutrients. These can amount to as much as 37% in bad conditions of weather and storage, compared with a loss of under 4% for hay stored under ideal conditions. Unfortunately it is the more valuable nutrients which are the most soluble and easily leached out by rain.

Bites of caviar mean tons of unwanted sturgeon

CAVIAR may be a gourmet's delight but it provides a headache for the sturgeon industry. With every portion of caviar comes tons of sturgeon, and what to do with it poses a problem, especially in Iran, which produces about 100 tons a year of caviar and some 2,000 tons of sturgeon, about half of which is unwanted.

We learned some interesting facts about caviar from a recent circular from F.A.O., Rome. Four species of sturgeon abound in the waters of the Caspian Sea and provide the roes for 96% of the world's yearly production of 2,000 tons. Russia produces 90% of this caviar and Iran 5-6%. In Russia the sturgeon, an excellent meat fish, is readily consumed. But in Iran it is unacceptable to a large part of the population.

Preservation of caviar itself presents problems. It cannot be frozen nor can it be sterilised by heat. It must be kept cold until consumed or have preservatives added. The most commonly used preservative for caviar is boric acid, which is acceptable in all countries except Germany and the U.S.A., two very good markets for the product. So for caviar which is exported to these countries salt is used, which gives a slightly salty product an even more salty taste.

Like vintage wine, caviar has to be treated with respect. It is always sealed in cans, never in glass

jars because the light would spoil it. The first essential is that the caviar must be absolutely fresh when canned, and only live fish, which are netted or caught on hook lines, are accepted by the processing plants, of which Iran possesses about 40. In these the roe is canned within half an hour of the fish arriving at the plant. The canned caviar is then taken to one of the country's two main checking stations where it is checked for quality and graded. Every can of caviar from the processing plants is opened, tasted by an expert, resealed and put into cold storage.

First grade caviar is greenish-grey with grains that are large and firm. Second grade caviar may range in colour from dark grey to black and the grains are small and fairly loose. There is also pressed caviar, not within the commercially accepted grades of caviar but nevertheless good and fresh. This is made from those roes where the membrane containing the eggs has broken and the eggs are a little soft. These roes are put into hot salt brine at 35°C. and then into a press, where the brine is squeezed out and the eggs broken down. The finished product, dried and salty, is put into barrels. Most of Iran's pressed caviar is exported to Russia.

Iran currently exports some 700 tons of sturgeon every year to Russia, 350 tons to the U.S.A. and the same amount to Europe, and consumes some 50 tons within its own country. F.A.O. have proposed to the Iranian Government that factories be set up to can the surplus sturgeon both for export and for internal consumption.

Soft drinks and the law

"VITAMIN C" drinks are under fire. The standing joint committee of London borough councils has been asked by Fulham Council to consider an approach to the Minister of Food to clear up uncertainties about the Food Standards (Soft Drinks) Order, 1953, and the Labelling of Foods Order, 1953.

The matter has been brought up because a public analyst found on sale a bottle labelled "Vitamin C Drink" without the full disclosure of the ingredients as required by the Labelling of Foods Order, 1953. It is said that some producers of this particular kind of food claim that it is exempt from the labelling requirements of this order on the grounds that it is a soft drink within the meaning of the Food Standards (Soft Drinks) Order, 1953.

If in fact the vitamin content of such drinks is no higher than is usual for soft drinks compounded of fruit juice with added essences and flavourings, the appellation is misleading if the purchaser thinks he is getting a drink specifically enriched in vitamin C.

The law in respect of soft drinks generally is far from satisfactory. Take, for example, the confusion that has existed for years on the subject of comminuted orange drinks, to which we have referred before.

Gleanings from a visit to Mallow

OUR roving correspondent paid a visit recently to Mallow in the Irish Republic in the hope, somewhat forlorn, that he would be shown the A.F.D. plant now under construction there. Not surprisingly he was disappointed, for at the moment there is little to see. We did in fact see the plant under construction at Swindon a little while ago; when finished it will be little more than several large steel cabinets and a lot of pipes.

Our correspondent did, however, obtain some interesting background information to the project and learned something about the Corporation which claims to be the first to exploit A.F.D. on a commercial scale. The Irish Sugar Corporation is a public body which is independent of Government control although the Government have an interest in it. It was founded in the early 1930s with the object of fostering a native sugar industry. In this they have succeeded, for the Republic is now self-sufficient in beet sugar production and even exports some. One outlet is the manufacture of chocolate crumb in the Rowntree and Cadbury-Fry factories in the vicinity of Mallow.

The Corporation's aim is to develop the land of Ireland to its best potential. For this purpose they supply seed to farmers and lend out machinery for draining and preparing their land. Although there are several fertiliser manufacturers in the country, the Corporation is the only one which makes fertiliser specifically for sugar beet.

One disadvantage of beet is that it is harvested in November and must be processed rapidly to avoid sugar losses. Processing is finished by the end of January. This means that large-capacity plants are used only for a short time. Hence the Corporation have gone in for other activities. Besides the fertiliser and seed interests they have developed a very successful sugar beet harvester which is now in production. They are also going in for A.F.D. because they are firmly convinced of its future success and believe that it will stimulate Irish farmers to produce more fruit and vegetables than they are doing at present. They are dedicated to the cause of food processing because they see it to be, and rightly, the one activity which will foster the prosperity of the Irish farmer and the development of the land. We understand that all the products of A.F.D. processing will be aimed at the export

market; under-developed countries without adequate cold-storage facilities are likely to be among the best customers.

Shellfish and sewage

ANNUAL value of current home production of shellfish being over £1 million and the consumption of oysters alone in this country being of the order of 5 million, it is evident that the shellfish industry is a sizeable one. Shellfish comprise crustaceans such as crabs, lobsters, prawns, shrimps and crayfish, and molluscs such as oysters, mussels, periwinkles, whelks and scallops. Those which are found in the open sea, such as crabs, lobsters and scallops, and which are cooked before being eaten, present different problems of hygiene from molluscs which inhabit estuaries and shallow waters; the former group, being frequently eaten cold in the form of prepared dishes present the same problems as cooked meat products, but the latter very often have little or no cooking and are often harvested from waters which are grossly polluted.

The problem of hygiene control in shellfish production was spotlighted recently at a meeting of the Royal Society of Health. Mr. T. D. Blott, medical officer of health for Chelmsford, dealt with some of the problems facing local authorities. Shellfish found in shallow coastal waters are gathered in great numbers by holiday-makers and local inhabitants whose consumption is impossible to control. Badly polluted areas can be designated closed areas and a prohibition on collecting shellfish from such areas enforced by law. This, however, does not adequately cope with the casual collector.

Pollution of estuaries by effluent and sewage disposal can cause much damage to commercial shellfish production. Often the pollution spreads a long way from the point of discharge, with no visible indication that it is present. Hence either the producer must treat the shellfish in such a way as to make them fit for consumption or the local authority must deal adequately with the source of pollution. Regarding sewage, however, as a coarsely-settled sewage from a well-maintained treatment plant may contain up to 29,700 faecal *coli*/ml and a fully treated effluent, 4,900 faecal *coli*/ml, the problem cannot be solved completely by the improvement of sewage treatment along conventional lines. This was pointed out in a paper by Mr. P. C. Wood, of the Fisheries Laboratory at Burnham-on-Crouch, who dealt with various methods of purifying shellfish, both by sterilisation and by relaying or tank purification. As oysters are largely eaten raw, only relaying or tank purification are practicable.

Telephone manners can affect sales

THE TELEPHONE is being increasingly used by marketing organisations as a medium for selling complementary to the work of the sales representatives. As with personal contact, the right approach is vital, and Fropax, who use this system on a large scale, recently held a refresher course for their "telesellers" in which tape-recorded dialogue illustrated the right and wrong ways of approaching the customer.

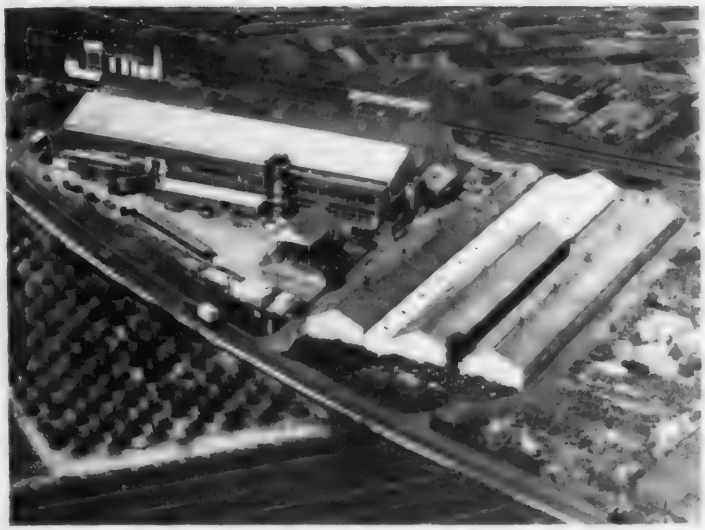
The telesellers were told that as they were in the position of never meeting the customer, their voices must be warm and friendly, the conversation must be interesting, objections must be met squarely, and above all it was important not to argue. The stockist at the other end of the telephone was unlikely to be anxious to do business; on the contrary, he was probably annoyed at having to come to the 'phone. It was therefore important not to make him even more impatient by not observing certain elementary rules, which are to have the right voice tone, to get the number right, to speak to the right person, to identify oneself at the right moment by using one's own name, and to keep the conversation friendly.

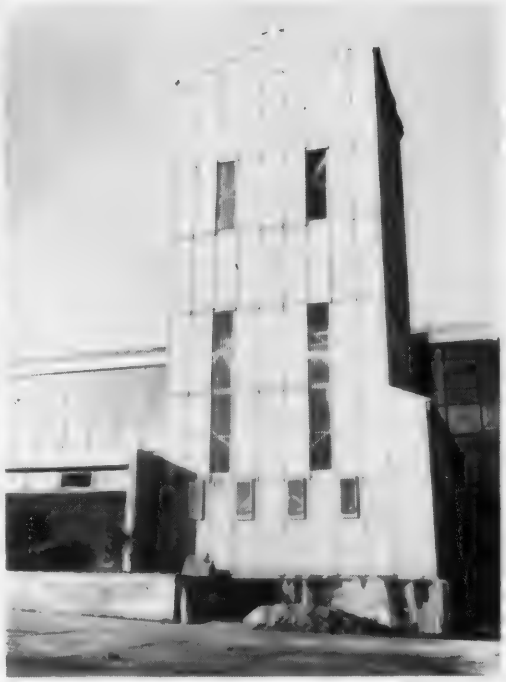
Axiomatic? Of course, but it is surprising how axioms are disregarded even by those who should know better. How many salesmen, for example, make the elementary error of thinking they can size a man up in thirty seconds' conversation and base their approach on their (frequently wrong) judgment. Another common mistake is to disregard the elementary rules of courtesy. Some salesmen imagine that a proffered cigarette is the bridge which immediately creates a bond between salesman and potential customer, forgetting that the latter is the host and that he is the one who decides whether smoking should take place. For a salesman to offer a cigarette is tantamount to rubbing in the host's discourtesy in not offering one.

In all relations between people, whether business or otherwise, by personal contact, by telephone or by letter, best results are always achieved when the relations are governed by courtesy and sincerity.

Business acumen among the cannibals

IT IS rumoured that the Governor of a certain island in the South Pacific, where, until recently, cannibals flourished, was puzzled by the continual and mysterious disappearance of the ashes of departed islanders after cremation. Investigation disclosed that an enterprising merchant was doing a roaring trade in the interior, selling the ashes, suitably seasoned and repackaged, as "Instant Man"!





(*Left*): **Aerial view of Smedley's Faversham factory.** (*Right*): **The structure which houses the hydrostatic steriliser.**

How Smedley's Streamline Pie Manufacture

Pilot production of new product at Faversham

A new meat product is one of the many items turned out by Smedley's factory at Faversham, which we recently visited, and in this exclusive article we describe some of the interesting variations on established production techniques which are to be seen there. Several varieties of pies and meat products as well as canned and frozen fruit and vegetables are among the factory's products.

SMEDLEY'S factory at Faversham in Kent is a well-knit establishment producing two main groups of products: fruit and vegetables, both frozen and canned; and meat products such as pies, sausages and hamburg steaks. The former group is of course largely seasonal, occupying the period from May until the last of the brussels sprouts in January or thereabouts; the firm's policy, however, of freezing and putting into cold store as much produce as they are able, spreads the load to a certain extent by packing frozen produce during the slack period.

Meat processing is less seasonal in character and is carried on all the year round, helping to attain to a considerable degree the goal of the canner, year round operation with a minimum of labour fluctuation. With the best will in the world, however, it is not possible to prevent this entirely, and the Faversham factory's basic labour force of about 160 people (of whom perhaps 70 are women) is augmented during the summer peak to about 450.

One of Smedley's latest products is *Cannelloni*, a pasta product with seasoned meat filling. It is a favourite dish on the Continent, particularly in Italy, and canned versions are produced in France, Italy and possibly elsewhere. Smedley's are, however, the first to introduce it to this country, and are at present producing it on a pilot scale and marketing it in small quantities; first reactions are extremely favourable, not surprising to those who, like ourselves, have sampled it. It is, however, a quality product

(*Left*): **Hamburg steaks being formed in a patty former and packed into cartons.** (*Right*): **Pastry blanks being cut for steak and kidney pies.**

aimed at the more discriminating consumer and not at the mass market, from which its price (4s. per can) will tend to exclude it.

Smedley's approach to the canning of this product differs from that of Continental producers in that they pack it in flat pie cans instead of the more conventional cylindrical cans; this approach emphasises the distinctive character of the product and allows a presentation more in keeping with the product's nature. It also saves the housewife washing up, since it can be heated and finally served on the table in the flat opened can.

How "Cannelloni" is produced

Pilot production of cannelloni was in progress during our visit. Its production is interesting from several points of view. In the first place, the machine which actually produces the cannelloni in its finished form was designed and made by Smedley's themselves. At present the plant for producing it can turn out a maximum of 400 dozen cans per day if necessary.

The basis of the pastry, as for pasta generally, is semolina, which however is mixed with a much lower quantity of water than is usual for pasta. Mixing is done in small vertical mixers, and the finished dough has an almost crumbly appearance. It must be remembered that, unlike other pasta, cannelloni is not dried before canning so that there is no point in adding the extra water in the first place.

The meat filling is made from frozen beef which is first cut into manageable pieces on a band saw and then put through a mincing machine. The meat is then braised in a steam-jacketed pan before being transferred to a bowl chopping machine.

Into the bowl with the meat is put the rest of the ingredients—spinach purée, grated cheese, salt, spices, rusk, etc.—and the filling is then finely chopped and mixed in the machine before being transferred to trays which are taken back to the cannelloni department.

Extrusion machine

The extrusion machine, as already mentioned, was designed and built in the factory and is basically very simple but extremely effective. Two orifices in the top receive separately the meat filling and the dough, which are forced down the orifices by hand with the aid of wooden plungers. The filling is extruded through an outlet hole by a rotating worm; the dough is forced out round the filling in the form of a tube by the pressure of the plunger.

Simple as the device is, about twelve months were spent on its development; one of the teething troubles was a line of toughness down the side of each cannelloni, evident when it was cooked and eaten, which was at first thought to be caused by contact with the bottom of the can. When a cannelloni was cut along its length, the toughness was seen to be caused by a thickening of the pastry running spirally and not straight. This gave the clue that the cause might be the extrusion worm, and examination indeed disclosed that the bearing of this was slightly out of truth. One of the requirements of a good cannelloni is that the pastry must be of even thickness all round.

After the cannelloni has been extruded from the machine, it is subdivided into lengths which are placed in cutting jigs and further cut into short pieces ready for canning; each can contains six of these pieces.

Canning of cannelloni

The remaining ingredients of cannelloni are mushroom garnish and gravy. The mushrooms are prepared and sliced by hand; slicing is carefully done to preserve the shape, and hand cutting is better than mechanical because the latter tends to pulp the mushrooms rather than cut the very thin sections desired. The shape of the slices too, important from the point of view of appearance, can be better controlled by manual cutting. Gravy is made in a steam-jacketed stainless steel pan mounted over a rotary brush sieving machine, through which the gravy is passed before use.

Canning procedure is as follows. The women who cut the cannelloni into pieces place them six at a time into can bodies which they then place on a moving belt. One woman has the job of weighing out the mushroom garnish and placing the weighed lots into the cans as they pass her on the belt; the cans with the cannelloni and the mushroom pass on to a filling machine which fills them with the appropriate weight of gravy.

The cans are now ready for lidding, and this is accomplished by two M.B. 24 DS seaming machines used as clinchers, the final seaming after exhausting being done by another machine of the same type. The reason for this procedure is that the cans, being wide and shallow, would easily spill their contents if subjected to too much manual handling, so to avoid this the two machines are used, which gives the women plenty of time for the little manual handling necessary.

After the lids are clinched, the cans pass on another conveyor belt through an exhauster. This is conventional in design and was built in the factory; cans take 1½ minutes to pass through.

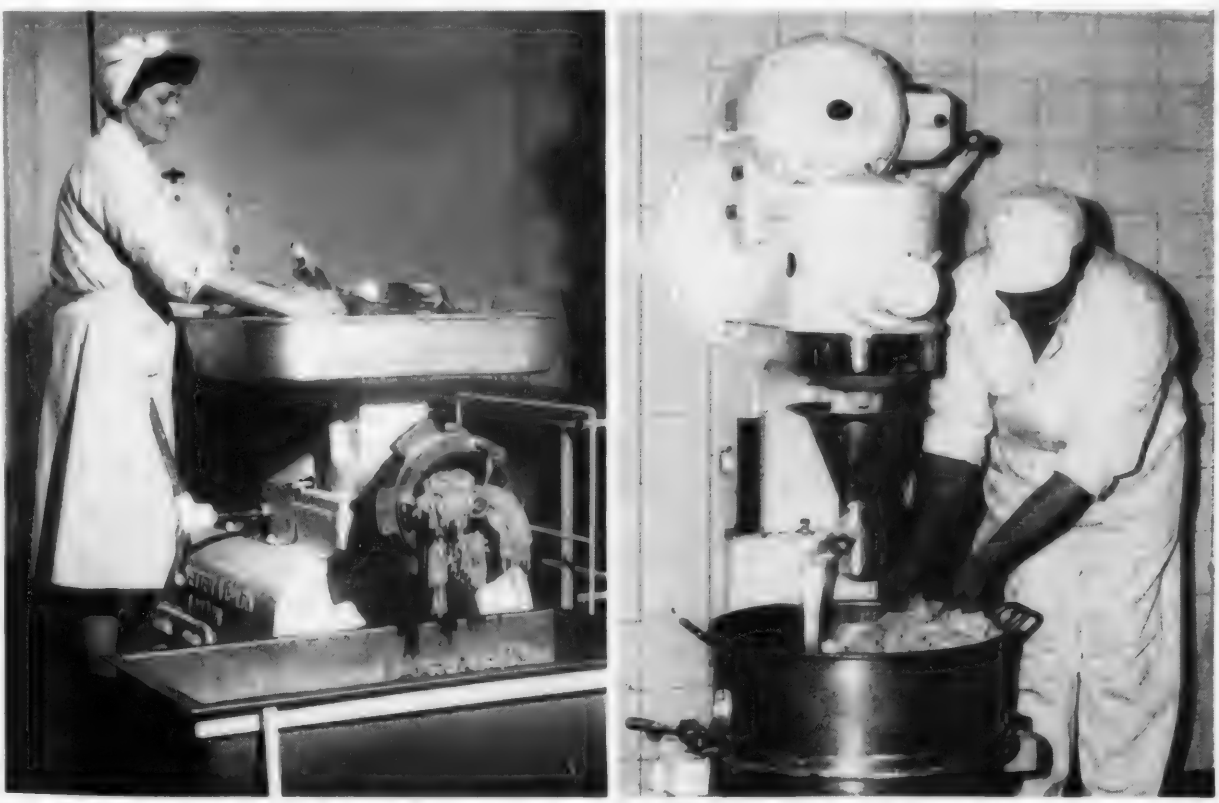
Final seaming is done by a M.B. 24 ADS sealing machine, after which the cans are collected on another conveyor and discharged into a retort cage. The usual sterilisation in pressure retorts completes the process.

Pie making

Manufacture of pies is carried out in the same department as cannelloni making, production being dovetailed so that much of the same machinery and labour can be used for both. Three kinds of pie are made—*Angus Steak*, *Devon Lamb* and *Steak and Kidney*. They are packed in cans of the same shape as those used for cannelloni. The first two types of pie have only a top of pastry; the third has a pastry body in addition.

Pastry is made in the same pair of vertical mixers as used for cannelloni. After mixing, the pastry is lifted from the bowl on to a table, where it is cut into blocks for feeding to a breaking machine. This rolls the blocks into flat sheets of the correct thickness for making the pie blanks. The sheets are transferred to a cutting table where the pie blanks are cut by hand with circular cutters, the unwanted pastry being returned to the mixers.

Frozen meat for the pies is prepared by being cut with a band saw and put through a dicer. A point about the dicing operation is that it will only work satisfactorily between certain limits of temperature, a requirement being that the meat must not be too hard or too soft. The dicing machine comprises two sets of knives at right angles, the meat being forced through them by means of a plunger and chopped by a rotary cutter blade immediately underneath the knives.



(*Left*): **Frozen beef being fed into a mincer before being formed into "Steakettes."** (*Right*): **Dough in a vertical mixer being checked before being used for canned meat pies.**

(*Left*): **Early morning briefing at the factory for the Smedley fieldsmen.** (*Right*): **Throughout the day the fieldsmen keep in touch with the factory by radio.**

Assembly of the pies is entirely manual but is carried out on a highly-organised production line. During our visit, *Devon Lamb Pies* were being made and the procedure was as follows. A number of women sat in a line alongside a moving conveyor belt; on each woman's left was a tray of ingredient, one kind for each woman, in front of her was a weighing scale, and on her right was the belt.

Pre-canning

Empty cans were placed one by one at the head of the belt and moved past the line of women. The first put in some of the carrots; the next three put in the meat (the last filling the cans which the other two had missed); the next two put in the rest of the carrots; the next measured in the gravy; the next positioned the pastry lids; and the last checkweighed each can.

The cans then passed to a M.B. CTV vacuum seaming machine, and the retort cages were loaded direct from the seamer and taken to the retorts when full. Occasional cans were taken at random and again checkweighed. By this means a sustained output of 30-40 pies per minute was achieved.

The gravy for the pies is made in two rectangular glass-lined pans heated by steam coils.

Sausage manufacture

The only type of sausage made in the factory is the skinless variety, and these are made in the conventional way; the meat is minced, weighed, chopped in the bowl chopper with the rest of the ingredients, stuffed into cellulose casings by means of a stuffing machine, linked with *Tylinkers*, blanched and chilled. Two points of interest are: (1) the fact that the sausages are sold in the cellulose casings, which are not removed in the factory; and (2) the method of blanching.

After emerging from the *Tylinkers* (of which there are three, two being normally used and the third kept in reserve) the sausages are flumed in hot water down a stainless steel channel whose total length is 120 ft. To save space the channel doubles back on itself several times. At the bottom of the channel the sausages fall into the cooling tank, while the water is collected separately and returned to a heating tank for recirculation through the blanching channel.

Hamburg steaks

Main ingredients for this product are minced beef, onion and rusk. The onions are minced, mixed with rusk and the mixture cooled and kept in the chillroom until required. It is treated as one ingredient.

Mixing of the minced beef with the onion/rusk mixture is carried out in a vertical mixer.

The steaks are made in two *Hollymatic* machines which form the flat sections, place a sheet of waxed paper on the bottom of each, and deliver on to a conveyor belt a pile of such sections of any number required. The standard Smedley's pack contains four hamburg steaks, and the machines are set to deliver a pile of four which are placed by hand into cartons. These then travel on the same conveyor belt to a wrapping machine which wraps the cartons in *Cellophane* at the rate of about 60 per minute, although on occasion 80 per minute has been achieved.

Here again the temperature of the meat mix is important, otherwise the machines will not operate properly. A temperature below 40°F. is the most suitable.

After wrapping, the cartons are placed on trays which are loaded on to trolleys; when full, these are taken to the tunnel freezers.

Another similar product, *Steakettes*, are made with three automatic machines which deliver the steakettes on to the same conveyor belt for cartoning and wrapping in a similar manner to hamburg steaks.

A pea cutter and green crop loader filling garden peas for the Faversham factory. The fieldsman and farmer are examining the pea vines in the field.

FRUIT AND VEGETABLES

It is not proposed to deal in great detail with fruit and vegetable processing, because although the greater part of the factory space is devoted to this, processing follows generally conventional lines, and also at the time of our visit very little processing of this nature was being carried out. One operation in progress, however, was the preparation of *Aylesbury Peas*.

Frozen pea handling

As previously mentioned, the factory like to freeze as much of the vegetable crop, particularly peas, as they can in bulk. The frozen produce can then be stored in the cold stores and packed into consumer-size packets later on in the year when the problem arises of adequately employing the available labour. This means that during the summer the two freezing tunnels are always worked to full capacity.

The peas are stored in multi-wall paper sacks with a waterproof inner lining, at a temperature of $-5°F$. For repacking into consumer packs, the peas are emptied into the hopper of a breaker; this consists of an uneven roller which breaks up the frozen agglomerates so that the peas can flow properly through the filling machine. From the breaker the peas pass along a picking table for a final inspection, under four magnets which remove tramp iron, up a worm lift to the heads of the filling machines (at the top of the lift are two more magnets) which fill the individual cartons. These pass through a carton closer (invented by one of the Smedley engineers) and thence to a wrapping machine. The wrapped cartons then go back to the cold store. So little heat is gained during this process, which is very rapid, that there is no need for the peas to be re-frozen.

Cartons are erected by a carton forming machine in a special room at first floor level, and after being coded by a coding machine are conveyed to the filling machine by an overhead conveyor.

Brussels sprouts

The last of the brussels sprout crop was also being dealt with at the time of our visit. Sprouts for freezing are specially grown small varieties. Processing consists of soaking in brine, blanching, cooling (a second blancher was being used for cooling), trimming by hand (an arduous task, but there is no other way of doing it), and loading into cartons by weight, the cartons then being wrapped and frozen in the normal way. A trimmer's average daily output is 1 cwt.

We were told that there are two schools of thought concerning brussels sprout processing, whether to trim before or after blanching. Smedley's prefer the second method; they say the sprout is firmer and the trimmings easier to remove after blanching, and that trimming before blanching involves greater waste.

The packing line for Aylesbury Quick-frozen Peas. The overhead chute delivering erected cartons from the carton room is seen.

Hydrostatic steriliser

Smedley's were one of the first firms in this country to install a hydrostatic steriliser several years ago. During the vegetable canning season it handles a large proportion of the pea pack and all the carrot pack.

Refrigeration plant

Freezing is carried out in two freezing tunnels and the frozen products stored in two main cold stores, all of these being refrigerated by three compressors (two 6 in. and one 9 in.) and a booster compressor. There are, in addition, a cold store for meat and an air-conditioned cool room for fruit, operated independently.

Altogether, there are two ammonia refrigeration plants (one main and one subsidiary) and one *Freon* plant.

The freezing tunnels operate at a temperature of between $-15°$ and $-20°$F. and freezing time, which varies of course to a certain extent with the product and whether frozen in bulk or packaged, is of the order of $1\frac{1}{4}$ hours.

Some Suppliers of Equipment

Adams Powell Equipment, Ltd.: sealing machine.
W. and T. Avery, Ltd.: weighing machines.
Beth Label and Wrapper Machines, Ltd.: labelling machines.
J. Collis and Sons, Ltd.: conveyors.
Alfred Dodman and Co., Ltd.: blanchers, canning retorts.
Forgrove Machinery Co., Ltd.: wrapping machines.
Hobart Manufacturing Co., Ltd.: mixers.
George W. King, Ltd.: hoists.
Lansing Bagnall, Ltd.: fork lift trucks.
Linker Machines, Inc.: sausage linkers.
Mather and Platt, Ltd.: vegetable processing machines, filling and canning machinery.
Metal Box Co., Ltd.: canning machines.
Mitchell Engineering, Ltd.: hydrostatic steriliser.
Stokes and Dalton, Ltd.: hamburg steak forming machines.
J. C. Wetter and Co., Ltd.: sausage machinery.
York Shipley, Ltd.: freezing tunnels, refrigeration plant.

Books Received

Compendium of Flour Milling

FIRST published in 1945, a 4th edition of *Flour Milling** by Sir J. F. Lockwood has recently appeared. Produced by the milling engineering firm of Henry Simon, Ltd., it is a lavish compendium of flour milling technology, which has been translated into French, Spanish, German and Serbo-Croat since its first appearance.

During the two years in which the work of re-writing has been carried out, we are told, a team of nearly a score of experts in the company's different departments of flour milling technology has contributed the latest findings on methods and techniques, covering not only traditional milling practice but also the most recent experimental work, some of which has still to reach full-scale commercial operation. Four pages are devoted to the new protein concentration process.

About a quarter of the text is completely new, and over two hundred additions have been made to the large number of illustrations in line and half tone, some of them in colour. There is an entirely new chapter on "Pneumatic Conveying in the Screenroom." "Pneumatic Conveying of Mill Stocks" has also been largely re-written and re-illustrated. In this short description it is impossible to mention all the changes, but thirty-three subjects are dealt with for the first time.

* *Flour Milling*. By Sir J. F. Lockwood. Henry Simon, Ltd., Stockport, 1960. Pp. 526. Price £5 5s. 0d. nett.

Quick Guide to Food Terms

THIS dictionary* of over 2,000 terms used in food technology, food manufacture and handling, and nutrition, is intended to be a quick reference book for specialists whose work impinges on the food field but who may lack detailed knowledge of its terminology. The list is alphabetical and comprises an assortment of common terms with a brief explanation of each accompanied, in many cases, by references to standard works where fuller information may be obtained.

We have medical terms such as (to quote at random) Hypophysectomy, Lymphatics, Jejunum, Intestine; biochemical terms such as Lipovitellenin, Physin, Secretin; chemical compounds; food products; natural substances; machines and instruments used in processing and quality control; and many other terms; the whole forming a useful quick reference book for those without a specialised knowledge of food science and technology.

* *Dictionary of Nutrition and Food Technology*. By Arnold E. Bender, B.SC., PH.D., F.R.I.C., M.R.S.H. Butterworth's Scientific Publications, London, 1960. Pp. 143. Price 30s. nett.

Breadmaking for the Student

THIS book* is divided into two parts, the first dealing with breadmaking and fermented goods, and the second with flour confectionery. It is aimed particularly at the apprentice and part-time student, and its subject matter is based on the syllabus approved by the Association of Bakery Teachers to cover the work of four sessions leading to the intermediate and final examinations of the City and Guilds of London Institute.

Each section is arranged in chapters with sub-headings corresponding to the lectures in the syllabuses. The author is lecturer-in-charge of Bakery Subjects at the South-east Essex Technical College and School of Art, and a past president of the Institute of British Bakers. His competence is therefore without question. The book is copiously illustrated with photographs and line drawings.

* *The Students' Technology of Breadmaking and Flour Confectionery*. By W. J. Fance, F.INST.B.B. Routledge and Kegan Paul, London, 1960. Pp. 443, with index. Price 56s. nett.

Watching the Pennies means Bigger Profits

Counting the Cost in Canning—II

By L. Shields, B.Sc.

Last month's article focused attention on yields and wastage with reference to raw materials. This concluding article examines costs of labour, administrative overheads and such essential items as packing materials, fuel and water, etc.

Miscellaneous materials

In addition to those raw materials which can be described as ingredients, there will be sundry items which are used as aids in the preparation, processing and packing operations.

For example, if carrots and root vegetables are lye-peeled, substantial quantities of caustic soda will be used.

Rust inhibitors might be used in cooling-water and chlorine, in some form, almost certainly. Adhesives and wire, if used for banding, must be costed either under this heading or as "packing expenses."

DIRECT LABOUR

In cost accounting it is usually convenient to classify as direct labour the cost of labour employed in altering the conformation, composition or condition of the product. There are, however, a number of related activities which are so closely associated with the work of production that it is appropriate to include them in this section.

Supervision on the factory floor, general labour receiving and despatching goods, quality inspectors and work checkers, normally employed in production departments, are examples. Services provided to assist in the management of the factory, such as maintenance engineers, canteen and welfare staff and those employed in the works office and laboratory come under the heading "indirect labour" and wages thus expended are an "oncost" or "factory overhead expense."

Direct labour is an element of "prime cost" and will be considered first. In the canning factory, it will be found that all labour concerned with production is in one of the following categories:

1. labour engaged exclusively on one particular product or filling line;
2. operatives and labourers whose work must be allocated to more than one product.

Preparation labour

Preparation labour is generally the major cost in the first category. The fruit and vegetable canner packs many products which require stalking, trimming or some other preliminary manual operation. In order to maintain efficiency, supervision and checking must be continuous, and accurate records of throughput and labour employed kept for the costings clerk.

He will also require to know the output of finished produce obtained from the raw material used. If, in the course of a day's work, more than one size of can has been packed it may be necessary to apportion the material usage (and the corresponding preparation labour) between these different packs.

Unless there has been some special quality consideration or grading, it is reasonable to divide this cost *pro rata* to the weight of material filled (*i.e.* number of cans produced × prescribed filling weight).

It does not follow, however, that labour employed on the filling line and closing machines can be dealt with in the same way. This cannot be related directly to the size of can; for example, the work involved in filling and closing A1 cans is not appreciably less than that entailed in handling A2's, although the output, in terms of weight of contents, is halved. For this reason, if accurate costings are required, the actual time and labour employed on each size of can must be recorded.

Processing labour

Having charged to each type of pack the cost of labour directly and exclusively involved, the costings clerk must apportion other labour costs concerned according to a pre-determined formula. It is not possible to specify a method of apportionment which is applicable in all circumstances, but the following examples indicate how this might be attempted:

General labour receiving and despatching goods— on basis of tonnage handled.

Unloading empty cans, labelling and packing—on basis of throughput of cans or cases.

Processing in retorts, if used—on basis of number of retort crates.

Brine, syrup or sauce manufacture—according to weight or volume used.

In all but the smallest canneries,

processing, labelling and packing are highly mechanised and the labour costs incurred are relatively small items. Most producers will have calculated a standard cost for these operations, and variations are inconsiderable.

Intermittent working

The allocation of labour costs as described above presents no great difficulty but, as with raw material costs, due regard must be given to possible fluctuations in supplies when budgets are being determined.

Many of the products on which the fruit and vegetable canner depends are available for a few weeks only and, in some instances, 50% or more of a season's output might be packed within a single week. At peak production, machines and operatives are working to full capacity and labour costs are minimal.

Unfortunately, neither material supplies nor labour can be turned on and off like a tap and, in consequence, it is necessary to engage and train staff in anticipation of this situation. This may be a matter of days or weeks, according to the type of labour required. At the end of a season it is often necessary to reduce to a small "nucleus staff" of supervisors and skilled operatives. Before this can be effective, however, it is almost certain that some idle time will have to be paid for and provision must also be made for the payment of accrued holiday pay to those who are redundant.

In order to estimate labour costs for seasonal packs, a prior knowledge of material quality and probable daily rate of delivery is desirable and this sort of knowledge can only be acquired from previous experience. This must be coupled with an accurate assessment of the training required and performance expected from temporary staff of varying abilities. Statistics kept throughout a complete season are of great value and will indicate the importance of budgeting for lower outputs and a less efficient use of labour at the beginning and end of a season.

Incentive schemes

In a number of canneries, women employed on preparation work are paid on a piece-work basis. This applies, for example, to the large number who are temporarily engaged on the "plugging" of strawberries. The system works effectively where supervision is adequate and keen. It is not generally regarded as satisfactory, however, where staff is permanently employed and where continuous flow production methods are in operation.

The payment of a production bonus to those feeding or operating machines or retorts presents no great problem, but difficulties do occur in the preparation section where some form of incentive scheme is most desirable. To have its maximum impact, bonus should be paid to individuals according to the work they perform. This necessitates the handling of plums in boxes, carrots in trays and so on, each woman's work being checked and recorded. It is also important to satisfy each worker that the size and quality of the material is consistent for all. Frequently the layout of the plant is such that it is uneconomic to break down the work done by individuals in this way.

Where continuous flow methods are in use, and a team is engaged on trimming and inspecting, a bonus paid to the group and based on throughput tonnage should be considered. If a record is kept of the hours worked by each individual it is simple to divide the bonus earned on this basis.

As with other incentive schemes, supervision of quality will need to be constantly maintained and frequent checks made on the raw material to see how it compares with specification. In most trimming operations, the number of units per lb. is the important factor in determining the output to be expected from a given number of operatives.

All books reviewed in FOOD MANUFACTURE as well as any other scientific or technical book may be obtained from:
Technical Books
308, Euston Road
London, N.W.1.
Tel.: Euston 5911.
Prompt attention is given to all orders.

PACKING MATERIALS

Under this heading will be included the cost of cans, labels, outer cartons or boxes, adhesives, stencils and, if used, banding or strapping wire.

The principal supplier of cans to the fruit and vegetable canning industry is the Metal Box Co., Ltd., and prices are listed according to size, tinplate and lacquer specifications. Delivery charges vary, but this is not usually a significant factor.

There are several manufacturers who specialise in the supply of outer cartons, and competition is keen. A prescribed case, guaranteed to conform to British Railway specifications, may be obtained at comparable cost from any one of them. Many canners now purchase uncertified cases and accept themselves the responsibility of transporting them without damage. The prices paid will vary according to the quality demanded and differences are often very considerable.

Labels also may be obtained in many quality grades but generally represent a relatively small item. They may not be required at all if lithographed cans have been supplied. Certain manufacturers have adopted the printed can for their principal lines.

The cost accountant will find it advantageous to use a standard "packing cost per dozen" for any given size of pack. He should be sure, however, before computing this figure that he knows the correct can and lacquer specification and the number of cans being packed per case. This standard cost should include a small allowance for cans damaged in handling or seaming and for cans opened for sampling purposes. On long, continuous runs this should not exceed 0·5%, but is likely to be more over a shorter period during which there have been plant or seamer alterations.

FUEL AND WATER

As it is difficult to relate the consumption of steam, water and electricity directly to individual products, some will prefer to class these expenses as "overheads" or more precisely as "works overheads." Yet in the canning industry these items are an indispensable part of the processing technique, consumption rising as production increases and falling to near zero when production ceases. In this sense, there is a good case for including fuel and water as part of the "prime cost."

It is not difficult to arrive at an appropriate formula for apportioning these costs, even though it may not be possible to meter or record usages for each separate pack. Steam, which is used principally in the manufacture of brine and syrup, blanching, exhausting and retorting processes, could, as a first approximation, be allocated on the basis of the total can contents produced.

Cooling water might be dealt with in the same way but special consideration must be given to the use of water for pre-cleaning, rumbling and pumping, etc., as this will vary considerably according to the product concerned.

INDIRECT LABOUR AND OVERHEADS

Indirect labour will include all wages paid to maintenance, welfare, canteen, works office and laboratory staff. It may, in some systems, cover also salaries paid to certain supervisory and administrative staff concerned with but not directly involved in production.

Administrative overheads

There will be other salaries, such as those of general office and senior executive staff, which are generally regarded as administrative overheads. In this category also will be included rent, rates, insurances, depreciation of plant, office and travelling expenses and a large number of other items of expenditure inevitably incurred in the organisation of an efficient business. All manufacturers will be aware of these costs and it is highly probable that they will be closely comparable in firms of similar size and scope. It is in the method of charging these indirect costs to individual products that anomalies arise.

In the first place, it is advisable to examine each item critically and allocate the cost directly, where possible, to a specific product or production line. For example, depreciation of pea-vining equipment and services in connection with the vining station must be charged to the canning of Garden Peas (part to Broad Beans if appropriate). Similarly, there may be certain hiring charges or insurances associated with machinery or materials for a particular product which can be allocated without difficulty.

General overheads

It is almost certain, however, that there will remain a substantial sum which will be classed as "general overheads" and which will necessarily have to be recovered in the cost accounts according to some arbitrary method or formula. Some accountants, applying principles used in other industries, endeavour to express these overheads as a percentage oncost, using as a basis the cost of direct labour or the total prime cost. Where the factory concerned is engaged consistently on the canning of a few non-seasonal products such as Processed Peas or Beans in Tomato Sauce, either of these methods may be considered satisfactory, but it is not often that such conditions prevail.

Generally the rate at which overheads are charged to a particular pack will be influenced by the following considerations:

1. the equipment involved and the output possible from the available plant;
2. the labour force required to make full use of plant capacity;
3. the expenditure incurred on materials, fuel and labour;
4. the cost of warehousing and financing stocks (a proportion of seasonal packs may be in store for several months);
5. the volume of demand and the necessity for sales promotion and advertising;
6. the administrative work entailed.

Most fruit and vegetable canning factories pack, according to season, those materials which are available and for which a demand is known to exist. In some cases the entire output must be achieved within 10-14 days, often the season may be from 3-8 weeks, but with certain packs it is reasonable to spread production over several months. If overheads were to be recovered at the same rate each week, some seasonal packs such as strawberries and garden peas, which demand an exceptional amount of preparatory planning and capital investment, would not take their due share. In consequence, less expensive products, such as carrots, macedoine, rhubarb and processed peas, would carry such a high rate of overhead that no margin of profit would be shown.

It may seem, from the examples given, that an oncost based upon the prime cost would be most satisfactory. There are, however, some relatively expensive fruits which can be prepared and packed mechanically and present no difficult equipment or labour problems, whereas others fluctuate extensively in price and require a large staff for preparation and inspection. Gooseberries come in the former category and damsons in the latter.

To avoid the errors which might arise from over-simplification, it is advisable to prepare a budget for the ensuing year, however speculative. With a knowledge of the quantities of each pack required and the anticipated annual overhead expenditure, it is possible to determine the rate at which overheads are to be recovered on each item. This will entail a careful assessment of all the factors involved and the close collaboration of executives responsible for sales, production and administration.

SALES AND DISTRIBUTION

For some years after the end of World War II, the demand for canned foods was so much in excess of supply that it was to the advantage of manufacturers and distributors that a list of recommended prices should be published for a wide range of commodities. The prices were determined by the manufacturers who allowed for reasonable margins for wholesaler and shopkeeper.

As production capacity and material availability caught up with demand, it became apparent that it would no longer be possible to agree prices in this way. The firm with a national distribution, backed by brand advertising, was generally able to command a better price for its goods than a lesser-known competitor. Looked at from another standpoint, it might be said that the small firm without any advertising expenses was able to undercut the larger.

The channels of distribution have also become less clear-cut. A number of food-canners have undertaken deliveries direct to retail stores, caterers and institutions; there are more multiples purchasing on a scale large enough to justify special price concessions and, particularly within the last few years, there has been a trend towards the establishment by large distributors or groups of wholesale merchants of branded packs which are produced for them under contract by manufacturers.

Costs related to type of business

Because of these differences in the nature of the trade undertaken by the various fruit and vegetable canners, it is not possible to compare costs of "sales and distribution" without some indication of the type of business transacted. A company which sells its entire output to a distributor, under contract, will have negligible selling costs and possibly no warehousing or transport problems, whereas a firm selling direct to customers throughout the country will probably employ a large sales force, advertise widely and make use of a number of warehouses and depots. Obviously, the price asked by the company with no selling organisation will be considerably lower than that which obtains in the general retail trade.

Most of the larger firms in the industry sell direct to large buyers and also through established wholesale grocers for re-sale. The overall cost of "sales and distribution" will depend upon the proportion of each type of trade. Although sales commissions and delivery costs can usually be allocated with reasonable accuracy to individual items, the cost of sales administration and advertising must be apportioned according to some arbitrary formula.

There is little doubt that some of the extremely low-priced offers which have been made to the trade have come from manufacturers with limited sales and advertising commitments. In order to ensure continuity of production and the finance of purchases on an adequate scale, it is not unusual to sell forward a considerable portion of each season's pack on an "ex-factory" or contract basis. This may include a nominal return for sales effort or none at all, the intention being to recover sales costs on the remainder of the pack which will be sold, in due course, through the normal trade channels.

* * *

Cost control is as important in the canning industry as in any other business activity. However, it is important in devising a satisfactory system that a broad view be taken of the year's operations and of market conditions. Because of wide variations in the nature of the raw materials used, figures should not be quoted for comparative purposes without reference to the quality of the fruit or vegetable purchased and the type of pack produced.

Although manufacturing costs for certain products may be closely comparable prices quoted may vary considerably. These will be largely determined by the amount of overheads and sales costs to be recovered, and by company policy on the manner in which this is to be accomplished.

Caucasian Tea Production . . .

forms the subject of an article in the April issue of **World Crops**, which features irrigation and water conservation.

Automation Progress discusses developments in cybernetics and process control by computer. The third part of "Hydraulic Servomechanisms" is also included.

A special issue on safety is offered by **Chemical and Process Engineering**, with three articles dealing with safety in the chemical industry, in the nuclear industry and explosion hazards.

Dairy Engineering reports on the Scottish Dairy Show and takes a fresh look at Uperisation.

Polyesters and epoxy resins are featured in **Fibres and Plastics** which also studies the Indian Jute Industry.

Manufacturing Chemist has a special issue on pumps and pumping and considers the borage family in the fourth part of "The Scent of Flowers and Leaves."

Two articles on polishes are included in **Paint Manufacture** and "Some Features affecting Gloss of Emulsion Paints" are examined.

"The Status of Geochemical Prospecting" and "Fire Precautions at a Middle East Oil Terminal" appear in this month's **Petroleum**, which also reviews the petroleum industry's fight against corrosion.

Specimen copies of these journals can be obtained by writing to the Circulation Manager, 9, Eden Street, London, N.W.1.

Notes for Contributors and Authors

The Editor of FOOD MANUFACTURE welcomes articles, news items and other contributions on all aspects of food production.

A preliminary synopsis should, preferably, be sent to the Editor, and the contribution itself should be typed in double spacing on one side of the paper only. It should be accompanied by photographs suitable for illustrations.

Size Reduction

Recent developments in machinery and methods reviewed

By R. V. Riley, Ph.D., B.Sc., F.I.M.

"Size reduction" is a term covering a variety of techniques. At least once, and often several times, food particles during processing have to be reduced in size. This article describes current equipment and machines for various purposes.

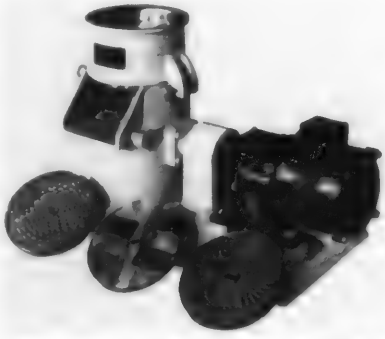
FLOUR milling was probably man's first serious attempt to prepare his food by size reduction machinery. Grinding stones operated by animal power and by water power were in use thousands of years ago and the miller as a tradesman certainly pre-dated the baker. Not very many years ago, food preparation was essentially a domestic art, practised by the women of the household. They started with basic raw materials, meat, vegetables, flour and fruit, and from these ingredients prepared by cutting, peeling, chopping and kneading, the dishes which pleased their menfolk. During the present century, almost unrecognised, a revolution has occurred; food preparation has become an industry in itself. In this industry, size reduction processes play a large and very important part. Few prepared foods, indeed, fail to pass through a comminuting stage between the farmer and the consumer. Modern palates demand food not only of the right taste but the right "chew." To obtain the correct consistency, the manufacturers of prepared foods have the choice of a whole range of machinery from primary crushers, such as rolls and jaw mills at the coarse end of the scale, to ultra-fine grinders, such as colloid mills.

Current size reduction equipment and techniques fall in the main into certain general functional classes:

(1) selective separation of "usable" from non-usable portions of the products;

(2) complete crushing of the whole product;

(3) uniform pre-sizing prior to blending or cooking;



A grating and slicing machine by Wm. Brierley, Collier and Hartley.

An output of 1-2 cwt./hr. is claimed for this dry granulator available from J. G. Jackson and Crockatt. The machine breaks down the product in two stages, giving a minimum of unwanted fines.

(4) complex crushing, grinding and homogenising operations to give desired consistency of product.

Primary breakdown of foods

Coarse grinding so far as foods are concerned is the primary treatment of the edible raw material to give a product of 6 to 35 mesh; intermediate from 35 mesh to 70% passing 200 mesh; and fine grinding from 70% minus 200 mesh down to 10 microns and even smaller.[1]

No single pulverising plant can be applied to all duties over this wide range of sizes. Differences in form, size, hardness, toughness, impurity tolerance, hygienic conditions of operation, moisture content and other factors, all call for modified designs of comminuting machinery.

All size reduction is essentially a stage process utilising in successive steps machines designed for the particular material and for the degree of fineness to which it may be reduced. Jaw crushers, stamps, toothed rolls and gyratory crushers are typical primary crushers; swing hammer mills, ring mills, cone crushers are extensively used for secondary crushing, whilst smooth rolls, pan mills, ball mills and tube mills form the basis of fine grinding. The reader who wishes to study the background of these operations could not do better than read Perry's *Chemical Engineers' Handbook*,[2] revised in 1950, or the less comprehensive, but very helpful, monograph, *Industrial Grinding and Reduction Plant*, by C. S. Darling.[3]

Probably the earliest use of coarse crushing machinery in the food industry was in the treatment

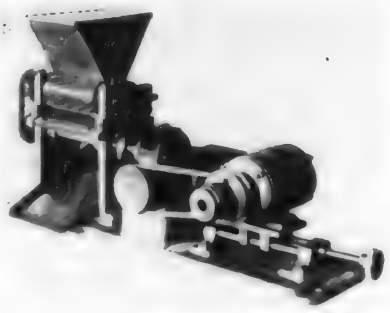
of sugar cane. For well over 400 years, rolls and stamps made in England were exported for this duty in tropical countries. Modern sugar crushing mills[4] consist of six strands of three rollers, 37 in. diameter by 84 in. long. These achieve a juice extraction efficiency of 96-97%. The mill rollers are of cast iron, grooved to increase the grip on the sugar cane. Each of the six strands is powered by a 600 h.p. steam turbine, which drives the rolls at 3-4 r.p.m. A modern trend is towards greater control, which can be achieved by the hydraulic adjustment of the rolls.[5, 6, 7]

Other primary crushing equipment, used in the chemical and kindred industries, such as jaw crushers, gyrators, ring roller and pan mills, find little application in the pre-sizing of food. However, the hammer mills and variants are widely applied. Proper spacing of the rotating blades in relation to the static anvils can produce in hammer mills a unique combination of shear forces and impact which serve to disrupt fibrous or tough materials. The hammer mill is, therefore, of value over a range of size reduction operations and becomes recognised as a "maid of all work." Sticky materials also respond well to treatment in this class of rotary disintegrator.[8]

Shredders and disintegrators

Swing-hammer shredders[9] for the reduction of a large range of commodities, including angelica root, copra, corn cob, fruit peel, ginger and liquorice root, can be used both as primary units and in multi-stage processes. The hammer mill is particularly adapted for use with sizing screens which preferably can be quickly changed without interruption of mill operation.[10, 11] This facility can be particularly useful when crushing agricultural products when a range of finished sizes are required from the same basic material.

Another form of versatile comminuting mill,[12] built in stainless steel, has rotor arms terminating in either a knife edge or a hammer face. The change from one to the other is made by reversing the direction of rotation of the rotor. A generous screening area is provided and interchange of the screens is accomplished in a matter of seconds. The speed of the mill is also variable, over a ratio of 5:1.



A nut nibbing machine by Wm. Brierley, Collier and Hartley.

To aid the drive to produce proteins direct from crops not normally used directly as food, a beater mill has been described recently.[13] The mill consists of a double beater with one arm working at a different speed and in the opposite direction to the other. With a 20 h.p. driving motor the machine is claimed to produce up to 6 tons/hour of useful ground material.

Theory of comminution

Shearing, mixing and emulsification actions occur in addition to size reduction in the swing-hammer mill.[14] The shearing action ruptures oil sacs and permits the processing of cocoa beans, pea nuts and almonds. The mixing action can be utilised if water is added to the mill at the same time as fruit, when purée may be produced economically. Some foods do not rupture completely without a degree of cutting action, and this can be obtained by a properly spaced blade system.

Much remains to be discovered about the true theory of size reduction. The Department of Scientific and Industrial Research, in a report on Chemical Engineering Research, 1951,[15] included in a classified list of urgent needs for early investigation the following:

(*a*) the relation between the power consumption and size of crushed product;

(*b*) an investigation into methods of avoiding or overcoming the effects of the contamination of the products by the materials of construction of the mill;

(*c*) the theory of fracture of solids by thermal shock;

(*d*) size reduction of natural products, *i.e.*, grain and fibres;

(*e*) fine grinding without temperature rise.

These problems are still with us despite much research work during the last decade.

Some materials which are tough or fibrous at normal temperatures become hard or brittle when cooled. Many vegetables can be troublesome to disintegrate in their normal form, but when subjected to intense cooling may be readily broken up in standard type crushers. Liquid nitrogen has been used as a coolant when dealing with substances containing vitamins or an aromatic flavouring component.[16] Other heat sensitive products such as powdered starch, soya flour and dried yeast may be ground in impact mills swept by cooled air.

Practically all of the energy required to fracture particles during crushing and grinding is energy of resilience. This energy deforms the material beyond its elastic limit and appears as heat released upon fracture. The amount absorbed as increased surface energy is very minute. A determination of this change of surface energy was made by Engelhardt,[17] who showed experimentally by means of electrical measurements that the grinding work done under given test conditions was only one-thousandth part of the gross energy which must be supplied to carry out the grinding operation.

Disc mills

Disc mills in principle consist of one or more revolving circular plates separated by a critical spacing which is partially filled with projecting teeth, pins or other grinding elements. Disc mills have been described which have three distinct zones,[18] and these

are particularly suitable for the preparation of groats, fruit, green foods, cereals, bulbs, sugar, etc.

Another disc mill was fitted with a hydraulic pressure adjustor to move the spacing of the discs.[19] This is proposed for the grinding of chocolate. A similar mill for pastes, pigments and mayonnaise employed specially designed scraping surfaces.[20]

Cronan[21] has described a 27-in. horizontal pin-disc mill mounted above a cyclone. The pins are inserted vertically on the periphery of a rotor, which moves in close proximity to but with a small clearance between it and the fixed vertical pins in the casing. Coarse particles fed at the centre of the disc are flung at high speed against the pins and the "fines" stream through, carried by an air blast into the receiving hopper beneath. When the pins become worn they may be rotated a quarter turn so as to present a new surface to the impacting solids. The pins are of steel, stainless steel or bronze and the peripheral speed of the rotor is 28,000 ft./min.

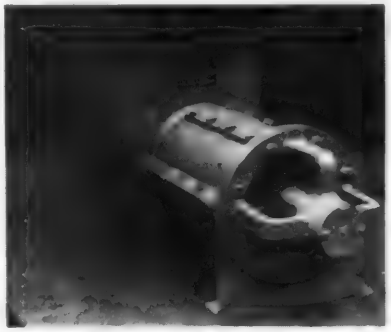
Coffee grinders are often specially designed disc mills which run at high speeds and consequently tend to overheat.[22] Since heat destroys the flavour of ground coffee, methods of water cooling the discs[23] or striker plates[24] are proposed.

A new principle in coffee grinding is a shaped breaker roll working against grooves in a stout sieve cloth. The crushings from the beans are pressed through the sieve by the breaker bars on the rotating roll. It is claimed that a production rate of 400 to 500 lb./hour of coffee less than 0·5 mm. mesh is thus possible.[25] Another free running coffee mill utilises air currents to keep the discs working well.[26] Pin-disc mills are capable of quite large outputs, as the capacities shown in Table 1 demonstrate.

Pin-disc mills have been found useful for the granulation of spices such as nutmeg, mace, mustard, caraway seed, etc.[28] For this purpose it is helpful to chill the spices with pieces of solid carbon dioxide during the grinding operation.

Mention has also been made of the application of vibration principles to disc mills.[29] A new series of belt-driven pin-disc mills has recently been introduced[30] which by re-design are now able to give higher rates of throughput and produce finer particles. The rotor speed has been increased from 15,000 to 19,000 r.p.m., and the horse-power of the driving motor has been increased pro rata. Air classification is also applied in some cases.

The *Petit* pulveriser[31] employs a smooth aluminium disc, 6 in. in diameter, rotated at speeds up to 42,000 r.p.m. There is a clearance between disc and stator of 0·020 in. The feedstock at 40 mesh, suspended in a stream of air or other suitable gas, is reduced to particle sizes of 1 to 10 microns at rates of up to 1 lb./hour, if necessary at sub-zero temperatures. Fracture in this mill is by tensional forces on the particles rather than by compression or shear.



The Scott Rietz prebreaker is used for the preliminary breaking down of green bone, ribs, shanks, beef heads, etc. These machines operate at speeds of only 30 to 50 r.p.m. and have a high torque for carrying out extremely tough jobs. By fitting an orifice plate on the delivery end, the machine can be made to give a graded product.

The Pascall triple roll mill provides for the better dispersion of creams, chocolate and pastes. Three models are available giving outputs from 10 to 100 lb./hr. The latest feature is a sliding centre roll and an adjustable front roll requiring only two controls. Independently adjustable guide plates are provided to regulate the width of feed.

A laboratory mill to crush cereals efficiently and rapidly for test purposes is available.[32]

Roller mills and flour milling

For many years the roller mill has been preferred for flour milling. Baking flour should not sustain damage to the starch cells during breakdown to 30-35 microns. Interesting developments in the feed of the partially crushed grain to the rollers are a specially designed scraper deflector[33] and a vibrating hammer which is supported wedge-like above the nip of the rolls.[34]

Roller-type flour mills may be fitted with a pneumatic discharge materials - conveyor which sucks off the ground flour from a point just below the rollers.[35] Another flour milling scheme has been described in patent literature[36] in which the whole of the fines are

Table 1.[27]—Pin-Disc Mill Outputs

Diameter of pin-discs (in.)	Spindle speed r.p.m. max.	Spindle speed r.p.m. min.	Motor size H.P.	Approx. output lb./hour	Size of raw materials up to (in. cube)
12	4,200	3,500	5 to 10	100-600	½
20	2,750	2,250	15 to 20	300-1,500	1
30	1,850	1,600	20 to 30	650-3,000	1½

Table 2.—How Typical Size Reducers Perform

Type	Action	Typical feed sizes	Typical product sizes	Capacity range tons/hr.	Power required Hp.-hr./ton	Used extensively for	Not usually used for	Remarks
Jaw crushers ...	Compression	6-72 in.	1-11 in.	10-1,000	0·3-1	Medium and hard rock	Soft, sticky materials	—
Gyratories:								
Large ...	Compression	6-72 in.	1-11 in.	35-3,500	0·2-0·7	Bones and hard materials	Soft, sticky materials	—
Small ...	Compression and impact	1-10 in.	¼-1½ in.	10-600	0·5-3	Bones and hard materials	—	—
Roll crushers:								
Smooth	Compression	¼-3 in.	⅛-⅝ in.	3-150	1-1½	Medium and tough, abrasive feeds	Large slippery lumps	Gives few fines; reduction ratio 4 : 1.
Toothed	Shear, attrition, impact	3-20 in.	2-8 in.	5-1,000	0·2-0·5	Friable feeds	Hard materials	Gives few fines; reduction ratio up to 8 : 1.
Revolving mills:								
Rod	Attrition (impact)	½-1 in.	4-28 mesh	3-120	0·5-4	Pregrinding abrasive feeds	Fine grinding	—
Ball, pebble, tube, compartment ...	Attrition and impact	30 mesh to 1 in.	20 to —200 mesh	0·5-75	10-20	Fine-grinding abrasive feeds	Soft materials	Often used for mixing and blending.
Hammer mills:								
Impactors ...	Impact	10 mesh to 10 in.	48 mesh to ½ in.	0·2-600	0·5-10	Abrasive feeds	Fine grinding	Handles damp feeds.
Swing hammer mills ...	Impact and attrition	20 mesh to 40 in.	—325 mesh to 2 in.	0·05-400	1-200	Almost any non-abrasive material	Abrasive feeds	Coarse to ultrafine reduction.
Cutters and shredders ...	Cutting	1-12-in. wide sheets	4-100 mesh	0·1-10	10-25	Soft lumps; fibrous, plastic materials	Hard materials	—
Ring roll mills, bowl mills ...	Rolling compression	20 mesh to 1 in.	—325 to 20 mesh	0·02-20	5-200	Soft to fairly hard materials	Abrasive feeds	Large amount of fines produced; mill usually air swept.
Attrition mills ...	Attrition	⅛-1 in.	—200 to 20 mesh	0·2-5	15-200	Soft, fibrous materials	Hard, abrasive feeds	—
Fluid energy mills	Impact (attrition)	100 mesh to ½ in.	1-30 microns	0·1-10	*	Moderately hard, friable feeds	Soft, sticky materials	Ultrafine reduction.

* 1-4 lb. of steam or 6-9 lb. compressed air per lb. of product.

removed from the base of the mill, to be classified in a separate pneumatic system.

Flour milling is changing from a craft to a scientifically controlled operation. The pressure on the grinding rolls must be regulated to suit the atmospheric conditions, and this can now be accomplished automatically.[37] Nanta[38] has in fact described a scheme for grinding of a blended mixture of cereals, the final product being delivered ready for the bag. (See FOOD MANUFACTURE, February, 1961, p. 49, for a description of a modern flour mill.)

Flour and meal milling industries suffer from dust explosions. A mill of 50 cu. ft. capacity would require only 1 oz. of powdered cereal to give the critical minimum concentration of 0·02 oz./cu. ft. necessary to cause an explosion. All mills, therefore, are liable to contain the necessary concentration of explosive particles. Preventative measures include the avoidance of explosive concentrations and ignition temperatures.[39] Le Clercq[40] has put forward a method of determining the liability to explosion of finely divided material, and Boyle and Llewellyn[41] in two detailed papers have also discussed this topic, especially from the point of view of ignition by electrostatic sparks.

A recent publication by H.M. Factory Inspectorate lists dusts under three classes—easily ignitable, less easily ignitable and those which did not ignite under the test conditions.[42] It is interesting to find milk powder in the "most dangerous" list.

Meat mincing

The perforated disc and cutting knives still remain an important way of cutting up raw or cooked meats, and developments have been mainly directed towards increasing speed and output and the control of size,[43-46] which may be achieved in part by providing more cutter discs, each giving only a part of the reduction in size. The worm feed screw has been replaced in some machines by gravity feed,[47] together with suction applied at the discharge end or a piston and cylinder principle which can be operated manually.[48]

Poultry meat may be recovered from the carcase after part-cooking by treatment in a modified disintegrator mill, followed by a flotation operation when the meat floats and the bony material sinks.[49] The same sequence in a slightly different mill is claimed to be equally effective for sea food.[50] The disintegrator mill is also applied to whole animal carcases for the recovery of fats[51] and the production of fish meal.[52]

Ball mills

This important type of mill for general fine grinding purposes has a limited application for foods, being more useful for harder materials. Laboratory mills have however, been adapted; the porcelain grinding pot and acid-resistant balls are very effective and hygienic.[53]

Rubber offers unique properties as a wear-resistant tough lining material for ball mills in which contamination of the product must be avoided. In a recent mill, the construction is such that the lining is permanently under compression, which is the ideal state for resisting abrasion.[54]

For the preparation of food samples, a new mechanical pestle and mortar takes the "grind" out of grinding and occupies only 15 × 10 in. of bench space.[55] It can be supplied with interchangeable mortars and pestles of porcelain, tool steel or agate to suit the needs.

This 5-in. abrasive mill by Premier Colloid Mills is being successfully used in food preparation, particularly for pulping citrus fruit (e.g. for soft drinks) and in the manufacture of processed cheese.

A ball mill lined with a heavy duty neoprene lining by Prodorite, Ltd. Such a mill is suitable for grinding fruit purées and other foods which have an acidic nature or which evolve gases.

Another laboratory tool for the food chemist is a new macerator of the beater mill type which has blades revolving at 10,000 r.p.m.[56] It is especially suitable for breaking down food samples to a homogeneous mass in a few minutes.

REFERENCES

1. H. W. Erickson. *Chem. Eng. Prog.*, February, 1953, 63.
2. J. H. Perry. *Chemical Engineer's Handbook*. McGraw-Hill, 3rd edition, 1950.
3. C. S. Darling. *Industrial Grinding and Reduction Plant*. Emmott, Manchester.
4. *Edgar Allen News*, 1953, **32**, 145.
5. U.S. Patent 2,869,452.
6. German Patent 1,043,978.
7. U.S. Patent 2,832,280.
8. Size Reduction Mill *Tornado*. *Ind. and Eng. Chem.*, 1960, **52**, 62.
9. Brochure, British Jeffrey-Diamond, Ltd., 1954.
10. U.S. Patent 2,706,087
11. U.S. Patent 2,732,137
12. W. C. Peck. *Chem. and Ind.*, March 10, 1956, 157-63.
13. K. Gauldie. *Engineering*, April 30, 1954, 557-9.
14. G. M. Kovac. *Food Engineering*, December, 1954, 73-80.
15. Report of the Committee on Chemical Engineering Research. D.S.I.R., London, H.M.S.O., 1951.
16. *International Chemical Engineering*, 1951, **32**, 13.
17. W. von Engelhardt. *Industrial Diamond Review*, 1949, **9**, 336; 1950, **10**, 19.
18. British Patent 785,103.
19. British Patent 789,359.
20. British Patent 786,911.
21. C. S. Cronan. *Chem. Eng.*, 1955 (10), 256-8.
22. German Patent 1,026,932.
23. German Patent 1,045,059.
24. U.S. Patent 2,834,552.
25. British Patent 757,607.
26. U.S. Patent 2,852,202.
27. *Edgar Allen News*, 1954, **33**, 6.
28. German Patent 1,090,402.
29. G. Gerth. *Mine and Quarry Engineering*, 1960, **26**, 30.
30. Kek, Ltd., Irongates, Manchester, 12.
31. *Petit* Pulveriser, *Ind. and Eng. Chem.*, June, 1956, 13A.
32. Casella Grain Mill (C. F. Cassella and Co., Ltd., London).
33. British Patent 811,871.
34. U.S. Patent 2,828,924.
35. U.S. Patent 2,717,124.
36. U.S. Patent 2,713,977.
37. U.S. Patent 2,713,460.
38. British Patent 741,403.
39. Hartmann. *Ind. Eng. Chem.*, 1948, **40**, 752.
40. R. Le Clercq. *L'Industrie Chim. Belge*, 1950, **15**, 3.
41. A. R. Boyle and F. J. Llewellyn. *Chem. and Ind.*, 1950, **69**, 45 and 173.
42. Dust Explosions in Factories, "Classified List of Dusts that have been tested for Explosibility in the form of a Dust Cloud." Form 830 (revised), January, 1959. H.M.S.O.
43. U.S. Patent 2,878,846.
44. U.S. Patent 2,863,480.
45. U.S. Patent 2,841,197.
46. German Patent 1,032,902.
47. U.S. Patent 2,836,825.
48. U.S. Patent 2,842,176.
49. U.S. Patent 2,858,222.
50. U.S. Patent 2,858,223.
51. German Patent 1,053,118.
52. *Manufacturing Chemist*, 1958, **26**, 505
53. *Ceramics*, August, 1955, 276.
54. Wilkinson Rubber Linatex, Ltd., England.
55. Shandon Scientific Co., Ltd. *Laboratory Practice*, July, 1955, lxxxvii.
56. Macerator, Townson and Mercer, Croydon, England.

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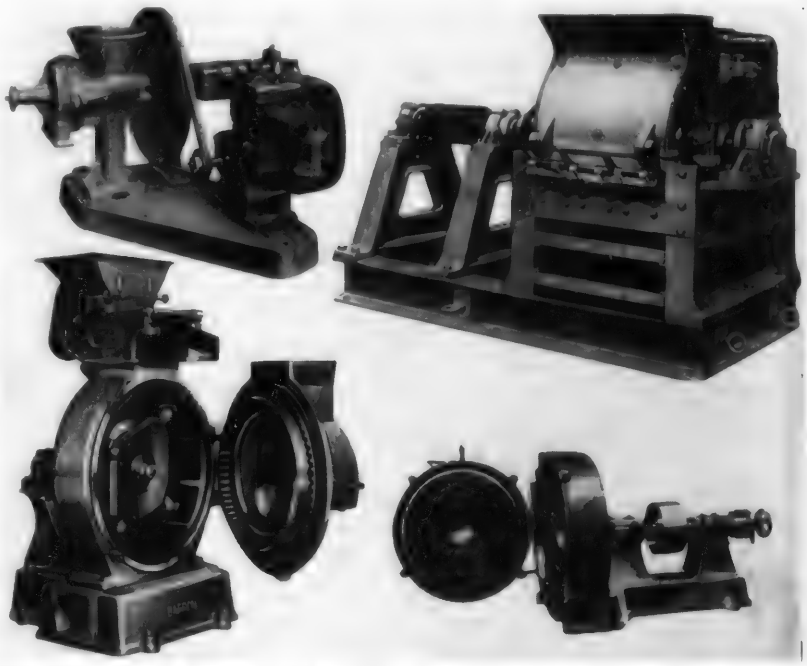
Grinders for Wheat and Compound Products

By J. A. JACKSON*

Grinding of cereal products with stones is one of the oldest food manufacturing operations, being practised as early as 5,000 B.C. and possibly earlier. This article describes types of grinders used in the cereal milling industry.

THE first examples of grinders about which we know were "pounding mills" in which grain was crushed with a rounded stone against a rocky surface with shallow depressions in the face. This gave way to the "saddle stone" and later to the "mortar and pestle," early examples of which have been found all over the world.

The rubbing together of stones produced grit in the meal which was both unpalatable and tooth-wearing. Man's ingenuity then suggested that grit could be reduced if the grindstones were slightly separated. This was achieved with the advent of the "quern" and the "millstone" whose surfaces reduced the grain rather than ground it. This latter was the greatest single advance in the art of grinding and differs from present-day milling only in the improvement of techniques, materials and tools. Even today within the wheat flour and compound milling industries there is a very large variety of grinding machines.



Machines by W. S. Barron and Son. (*Top, left*): **The "Pep" Mill.** (*Top, right*): **No. 7 impact grinder.** (*Bottom, left*): **No. 5 impact grinder.** (*Bottom, right*): **"Dreadnought" grinder.**

Older type grindstones

Still used in some of the smaller mills in this country are the horizontal stone grinders or "hursting mills." These are used mainly in the manufacture of wheatmeal or wholemeal products as the texture, appearance and taste is often of superior quality. Unfortunately, these stones require regular and expert dressing and it is becoming increasingly difficult to find experienced men for this job.

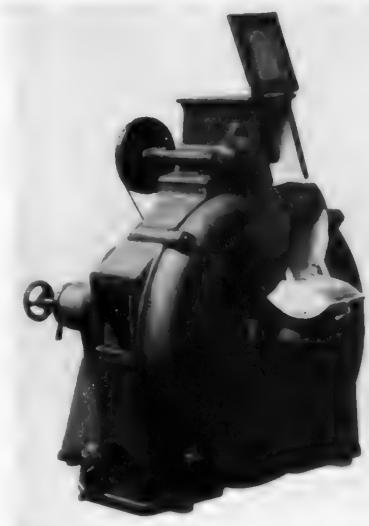
There are two such grindstone varieties, one in which the top stone rotates, the other in which the bottom stone rotates. The top runner type has a very low capacity and the grinding adjustment is hard to regulate as the pressure is derived from the weight of the revolving stone. The under runner type operates at a higher speed, has a higher capacity and embodies a mechanical grinding adjustment. The few advantages of the horizontal stone grinders are far outweighed by the many advantages of the vertical stone grinder which is in regular use. These advantages are:

1. that it is usually more convenient to drive a horizontal shaft than a vertical one;
2. a larger capacity is achieved due to the higher speeds at which vertical machines may be driven;
3. the stones are more easily dressed due to a simple furrow arrangement;
4. there is a superior feeding arrangement;
5. cost of maintenance is lower, there is greater accessibility and smaller floor space is occupied.

Vertical stone grinders

An example of the vertical type of attrition stone grinder is the Barron *Dreadnought*. In this machine, the runner stone is mounted on a horizontal shaft supported on three ring-oiling bearings, the grinding pressure being regulated by a threaded bolt which bears against a thrust bearing at the end of the driving shaft. The bolt is operated by a handwheel which moves the runner stone towards or away from the fixed stone. Coil springs are inserted between the bolt and shaft to allow the

* Henry Simon, Ltd.



This "Universal" grinder for cereals and friable foods is fitted with composition stones for grinding barley, oats, maize, beans, peas, etc. It will also grind into a soft meal the different by-products of the mill as fine bran, screenings, etc. It is made in two sizes, 30 and 36 in., which give outputs on pulses on 650 and 900 lb./hr. respectively.

stones to spring apart should a foreign body enter. The stock is fed into the machine over a feed roll driven from the stone shaft by a pulley through a pair of bevel gears. A clutch is fitted so that the feed can be stopped as required.

By means of suitable furrows or grooves the stock to be ground is gradually reduced by passing over the face between one furrow and another whilst at the same time taken out by centrifugal force to the periphery of the stone for discharge. The quality or fineness of grinding is controlled by the pressure exerted between the stationary and revolving stones and also by the particle size and sharpness of the individual grains of which the stones consist.

The stones vary from 12 inches to 3 feet in diameter and the speed of the runner stone varies from 500-750 r.p.m. They are made of special composition of which the grade is varied to suit the material to be ground. The stones can be made of either emery composition, burr composition, natural burr, or in some cases vitrified emery. The mixture is poured in liquid form on to cast backplates having undercut grooves which hold the composition in place when it is set. The backing is then made up with cement.

The natural stone used today is either French Burr or Derbyshire Peak, but it has lost its popularity in the flour milling industry, being used more for the grinding of cork and pigments, etc. The preference for composition as opposed to natural stone is due to:

1. its uniform hardness;
2. the method of construction, stiffening the stone and enabling it to be used until the composition portion is almost entirely worn away; the simplicity in changing stones and the method of mounting them on the driving shaft of the grinder;
3. their being self-sharpening owing to the large number of cutting edges presented by the small embedded particles;
4. their longer life;
5. their greater capacity for a given horse power.

Attrition grinders

A development from the vertical stone grinder is the attrition grinder in which chilled metal grinding plates take the place of the stones. The object of using metal discs was to eliminate skilled dressing and to increase the life of the grinding faces. Two systems are used, one in which only one disc revolves and the other in which both discs revolve.

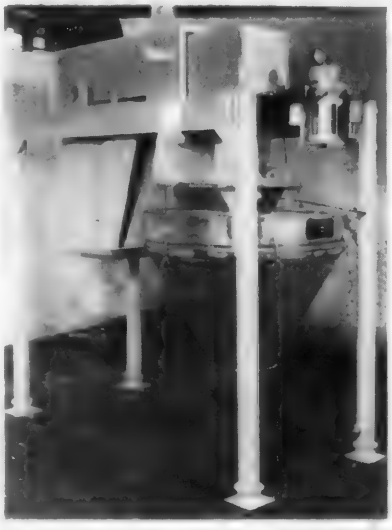
In the *Dreadnought D.P.* type mentioned above the discs have sickle-shaped grooves or furrows on both sides so that they can be reversed when worn. Despite its many advantages this type of grinder is used mainly in smaller plants as the capacity and uniformity of product is not sufficient for the larger compound miller.

Grinders with both discs revolving are run at greater speeds and have a much higher capacity. Each disc is carried on a separate shaft which is mounted on roller bearings, the discs revolving in opposite directions. The direction of rotation can be reversed in order to equalise wear. A set of inclined spokes at the centre of one of the discs carries the feed to the machine between the discs. The fineness of grind is regulated by means of bolts underneath the outer main bearings.

Although described as attrition grinders, those using metal discs break up a certain amount of material by impact or percussion. Control of particle size is therefore difficult because there is no self-contained grading screen to prevent the escape of material before it has been reduced to a uniform size. This can be overcome by using a dressing machine from which the coarser particles of material can be re-ground after the fines have been sifted out. One of the characteristics of attrition grinders, however, is a high power consumption.

Percussion grinders

Percussion grinders are the only type of grinder capable of giving in one operation the high capacity and uniformity of product necessary for compounding. This uniformity is controlled by the size of perforation of the interchangeable screen through which the material must pass before leaving the machine.



Capacities of this "Entoleter" impact mill by Henry Simon range from 200 to 500 lb. hr. per horsepower. Machines up to 40 h.p. are available giving a maximum throughput of 20,000 lb./hr. It will reduce ½-in. size charge to micron sizes.

In the many types of percussion grinders available, hammer mills, pin disc mills, revolving cage type mills and so on, all have one characteristic in common, that is, that the reduction of the material to be ground is brought about by its impact with metallic bodies revolving at high speeds of over 20,000 ft./min. The three main types of percussion grinders are:

1. single stage with rigid beaters;
2. multi-stage with rigid or semi-rigid beaters;
3. single stage with free swinging hammers.

A high-speed pulveriser of the swing hammer type made by British Jeffrey-Diamond. The streamlined cover and ease of dismantling are of particular interest from the hygienic viewpoint.

Machines of the first type usually have a set of beaters fixed to a shaft which rotates in a single grinding chamber, fitted with a periphery screen. The beaters, revolving at high speed break up the material and project it against the side and periphery of the chamber. The grinding action is assisted by serrations or corrugations fitted on both sides of the chamber which throw the feed back into the path of the beaters. This action is repeated until the feed is sufficiently reduced in size to pass through the periphery screen.

A typical multi-stage machine has a number of rigid or semi-rigid beaters fixed to a revolving shaft and the feed is ground in two or more stages as distinct from the single stage. The Barron *Impact Grinder*, which is an example of one of these, has stationary bedrings in the grinding chamber, and a preliminary set of rotating beaters first reduce the material against the stationary bedrings, and then pass the stock into the main grinding chamber where additional beaters complete the grinding against a perforated screen. Frequently the perforated screen is fitted at intervals with steel bars placed across the periphery of the screening ring so as to prevent the stock racing round the screen chamber and affecting the grinding efficiency.

Hammer mills

The essential difference between the hammer mill and others described is that the beaters in this type of machine are pivoted to a revolving shaft in such a way that they are free to swing through an arc which is limited to their plane of rotation. One of the advantages of hammer mills is that in the event of the entry of a foreign body, such as a nut or bolt, less damage is liable to be caused than in a machine of the rigid beater type. Usually the worst result is the bursting of a screen which can easily be replaced.

Unlike other types of grinders, the feed to hammer mills enters the machine at some point on the periphery and not at the centre. The grinding chamber is formed by a series of circular steel plates built up on a shaft and separated sufficiently to allow the hammers to be mounted between them upon transverse spindles which pass through the beaters near their outer edge. The work of the hammer mill is controlled by adjusting the speed of the beaters and the distance between the beaters and the perforated screen. High speeds and small clearances give a fine grind, slower speeds and greater clearances a coarser grind.

Pin disc mills

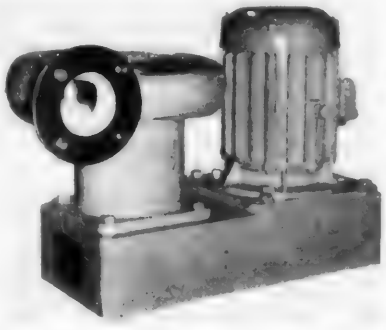
Although pin disc mills have been used for the reduction of particle size in many industries for some considerable time, it is only recently that an application has been found for them in the food industry. In a particular grinder of this type, the Kek mill, material is fed between two parallel discs (one of which rotates at high speed) which are fitted with a large number of pins. In its passage from the centre of the discs to the collecting volute on the outside, the material is subjected to the action of a large number of high speed air vortices—and in its passages through these a considerable measure of size reduction takes place.

Rollermills

In the flour milling industry where purity of product is of primary importance, a gradual reduction in size of certain portions of the wheat berry is employed. There are two basic reasons in the food industry for the gradual reduction of particle size. The first reason is in consideration of quality.

In food processing, whenever a separation needs to be made between the desired product and its outer coating, and when there is little difference in their resistance to grinding, a gradual reduction of particle size followed by a separating process must be adopted, otherwise a miscellaneous "mass" of mixed purity would be produced. The second reason is to avoid excessive heat and wear which would result if it were attempted to pulverise hard materials in a single operation.

In the milling of wheat flour, the object is to separate the endosperm from its outer coating of bran in as pure a form as possible. Owing to the difficulty in making this clear cut separation, what has become known as the Gradual Reduction Process has evolved in which the wheat berry is subjected to a succession of grinding operations, particles of bran being released after each grind. For this operation, grinding is done on a "rollermill" which differs substantially in design and in method of operation from the high speed grinder used in compound and provender milling.



The 4B Kek mill fitted with involute delivery ring.

The rollermill has a more limited but specialised application and its advantages make it particularly suited to the grinding for high quality products such as wheat flour and semolina. These advantages are:

1. a comparatively lower power consumption;
2. cooler grinding with a consequent reduction in evaporative loss and a ground product with a lower temperature, thereby improving its keeping qualities;
3. a product of more even size and texture and brighter appearance.

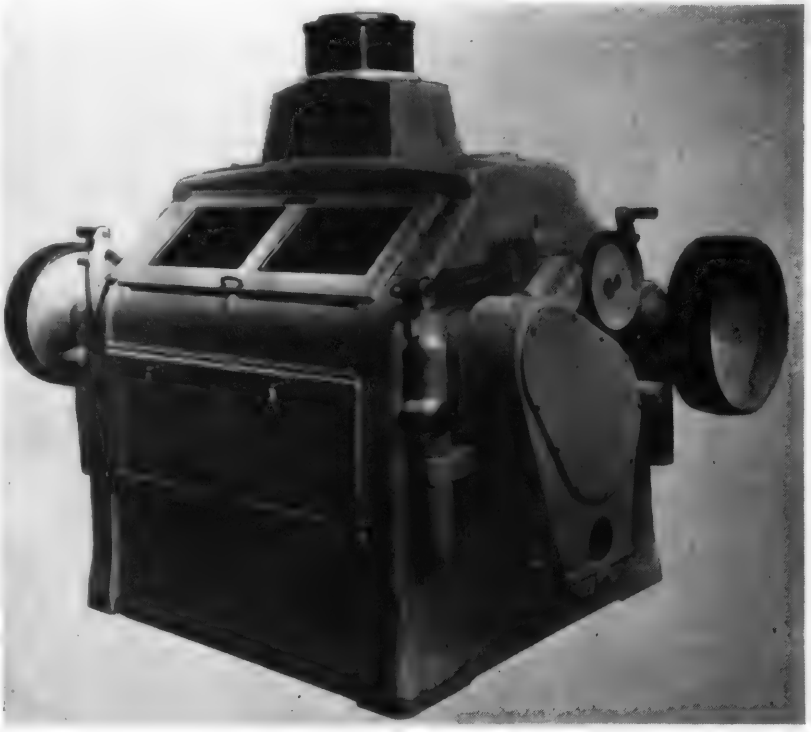
The Simon rollermill consists of two separate units set back to back each having its own pair of rolls, feed mechanism, delivery and drive. They are housed together in one main frame simply for the sake of compactness and to reduce the cost of manufacture. The rolls, mounted at 45° to the horizontal, can be of two surface types depending on the job they have to perform. Fluted rolls are used for cutting open the wheat grains and scraping loose the endosperm in them from the bran. Smooth rolls are used for grinding the purified endosperm into flour.

The main rolls of a rollermill rotate in opposite directions so that at the nip (where the rolls come closest together) the grinding surfaces are moving in the same direction. This is necessary because the feed would not be satisfactorily carried through the nip unless both of the roll surfaces moved inward towards it from the feed side.

The rolls are driven at different speeds so that they have a shearing action on the stock, otherwise the stock passing between them would merely be crushed and flattened into flakes instead of being broken into finer particles as they should be. The ratio between fluted roll speeds is about $2\frac{1}{2}:1$; in the case of smooth rolls the ratio is $1\frac{1}{4}:1$, the top roll being the faster. The small differential enables the smooth rolls to flatten the bran while breaking up the endosperm so that the subsequent removal of the bran is made easier.

The shearing action of the flutes of which there can be any number from about 10 to 35 per inch of roll surface, is more effective if they are cut at a spiral angle. In normal British practice the roll flutes have a spiral angle of 1 in 7 which affects a scissors action at the nip of the rolls.

Successful roller grinding depends to a large extent on the even spreading of the feed along the whole length of the rolls so that the grinding pressure is uniform from end to end. The mechanism that is used for spreading the feed consists of a pair of fluted feed rolls diagonally mounted and equal to the main rolls in length, and a balanced feed gate which controls the amount of stock that can flow over the upper feed roll. This gate is balanced against a balance plate on which the feed falls when it comes to the rollermill. When the rate of feeding increases the balance plate is depressed and the

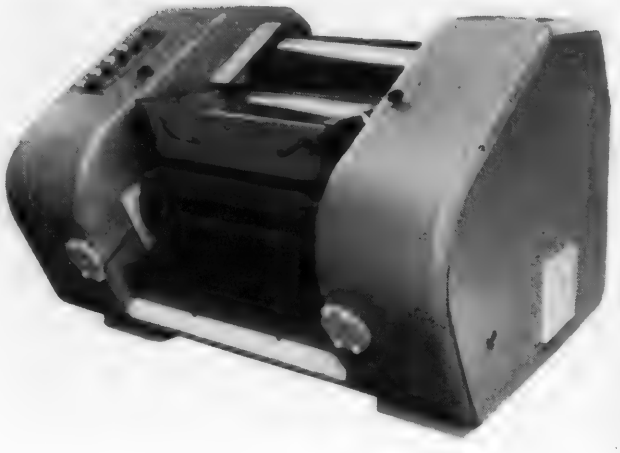


Simon Type G rollermill.

feed gate is lifted allowing more feed to pass over the feed rolls. The upper feed roll carries the feed through the gate in a uniform layer and delivers it to the lower feed roll, which, running three or four times as fast as the upper one, thins out the stock and feeds it into the nip of the main rolls.

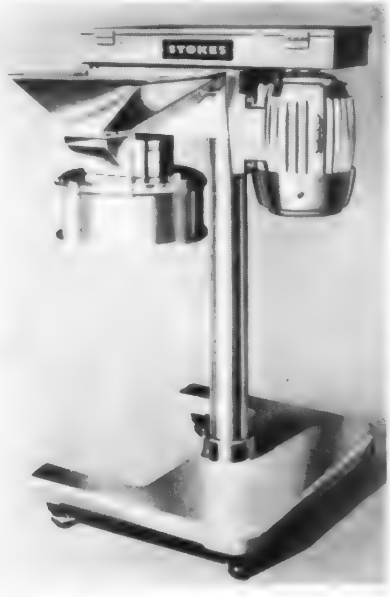
If the main rolls were allowed to come into contact as a result of an interruption of the feed, their surfaces would suffer damage because of their different running speed. This damage would be specially severe in the case of fluted rolls. A mechanism is therefore provided for automatically throwing the main rolls slightly apart should the feed run off and for closing them again when it is restored. As well as this automatic mechanism, a hand lever is provided for manual operation.

To prevent stock from passing unground through the open rolls, the hand lever is linked to a clutch in the feed roll drive, so that the feed rolls stop when the rolls are opened and start when they are closed. When the throw-out lever is lowered the bottom roll falls, leaving a clearance of about 1/10 in. between itself and the upper roll. Pushing the hand lever back towards the machine lifts the lower roll into the grinding position again. The clearance between the rolls is effected by an adjustment screw situated at the base of the throw-out lever.



Compactness, accurate control and easy maintenance are features of this hydraulic triple roll mill made by Cox's Machinery Ltd.

In any pair of rolls the lower roll is a true cylinder throughout its length but in the case of smooth rolls the upper roll is slightly tapered for about 6 in. at each end. At the extreme ends the reduction in diameter is about 0·002 in. The purpose of tapering is to allow for deflection of the rolls under load and for the fact that the ends of the rolls absorb heat from the bearings as well as the heat that grinding generates. The extra heat from the bearings causes the rolls to expand rather more at the ends than in the middle. The exact amount of the taper is varied to suit the amount and nature of the feed, the grinding pressure to be used and the length and diameter of the rolls. The diameter is usually 10 in., the length either 24, 32, 40, 50 or 60 in.



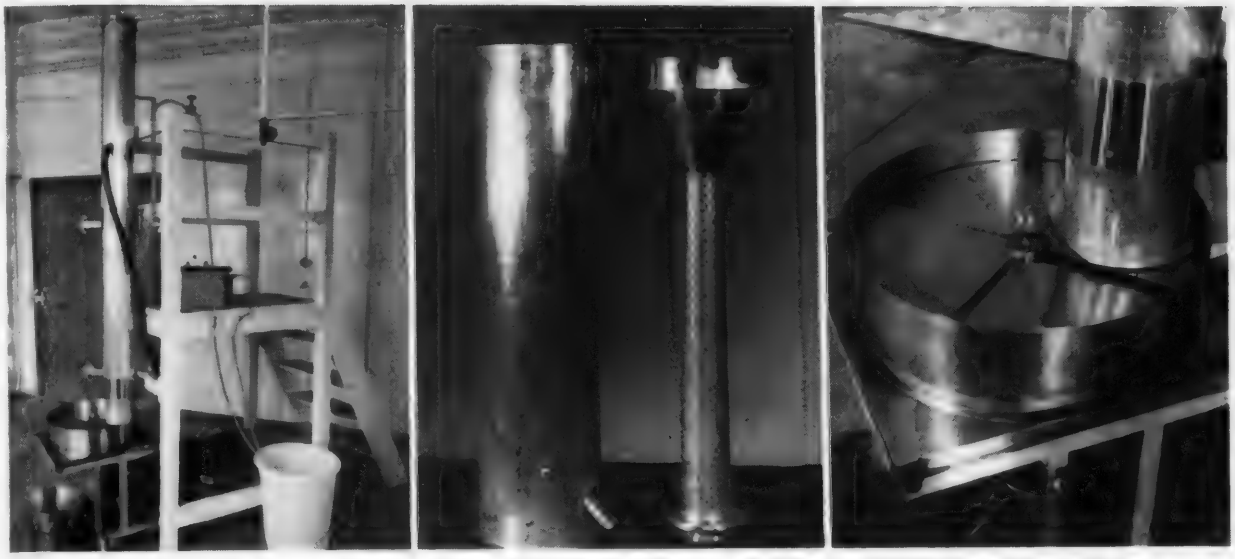
A rotor diameter of 10 in. and a screen area of 160 sq. in. are features of this "Tornado" mill. The size of the mesh in the screen can be varied according to the particle size desired.

Grinding by air

One of the most recent grinders to come on to the market is that in which air is used as the grinding medium. An example of this type, manufactured by W. S. Barron and Son, Ltd., is the *Micromatic Mill*. This is a vertical grinder in which the feed is introduced by means of a quickly rotating worm. The grinding chamber has on its periphery a large number of novel shaped grinding pockets. These pockets are subjected to air vibrations caused by a rapidly rotating fan shaft within the chamber with closely set radial impellers on it. As the material is fed into the machine, the revolving impellers drive it into the grinding pockets where it shatters itself due to the air eddies set up by the blades passing over the pockets. The frequency of the blades passing over each pocket being 20,000 to 30,000 times per minute.

Whilst the stock is being shattered in the pockets, air is drawn by a fan through the pockets via a series of air inlets at the side of the machine. The fineness of product is mainly controlled by the rate of travel along the pockets. The speed of travel is controlled by the amount of air allowed into the machine, and also by the amount of air allowed to enter the fan at the opposite side of the mill.

All the grinding machines described have very wide applications, not being confined only to the grinding of materials for foodstuffs. Although these machines are now well established in a flourishing and highly competitive market, efforts are constantly being made to reduce h.p. consumption and manufacturing costs.



The continuous cheddaring machine developed by the N.I.R.D. (*Left*): **General view of the prototype.** (*Centre*): **The upper section of the tapered cylinder perforated for separating whey from curds.** (*Right*): **The bottom of the cheddaring cylinder showing curd cutter, which also supports curd column.**

★ PROGRESS IN 1960 ★

A Good Year for the Dairy Industry—II

Emphasis is on mechanisation and continuous processes

By W. G. Wearmouth,* Ph.D., B.Sc., F.Inst.P., A.R.I.C., and Janet Phaal,* B.Sc.

Last month the authors dealt with new developments in the technology of liquid milk. This month they turn to milk products, cream, butter and cheese; the pattern that emerges in the Dairy Industry of today is increased mechanisation and more continuous processing.

MILK PRODUCTS

The coconut-like flavour defect[12] of some milk products probably has 5-hydroxydecanoic acid as its precursor. It is present in the lowest melting point fraction of the butterfat, representing 0·4% of it. In fresh butterfat it is probably present in ester form, as hydrolysis by Na_2CO_3 or lipase is necessary to release it.

Flavoured milk products

The treatment of milk to add food value or provide a different flavour results in a wider market and has attracted interest.

Calcium enriched milk particularly for infant feeding is the claim of an American company.[43] The product is not too thick for baby food and the insoluble calcium does not settle out on storage. Irish moss and milk proteins dissolved in water and mixed with a finely divided calcium compound are interacted at a minimum of 145°F. but below the curdling point of milk, and then cooled.

It has been shown that small amounts of acid[44] added to fruit flavoured drinks improve the flavour; strawberry flavoured milk proved most popular.

An American patent[45] described a chocolate foam topping, suitable for dispensing as a foam or whip from a pressurised container. The topping incorporates 10-20% milk solids and up to 45% liquid whole milk.

An Italian paper[46] describes three chocolate drinks made from whole or skim milk. It describes factors which affect the quality of the end products.

Cultured milk products

The Dairy Research Institute in Prague[47] has carried out tests on various types of cultured milk. Methods for improving yoghurt quality and for mechanising the production of fruit yoghurt are described in this paper. The enrichment of yoghurt with ascorbic acid is also discussed.

A new method for the production of cultured buttermilk by the pressure injection of melted butter

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into cold buttermilk to obtain butter granules of the required size is mentioned. Another product discussed is carbonated milk produced when required by injecting CO_2 into a pressure vessel containing cooled milk to which sugar has been added. The carbonated milk is dispensed straight into the customer's container.

Carbonated milk

A West Austrian patent [48] describes the production of carbonated milk, whey, etc. A mixture of 40% sour milk, 50% whey, and 10% fruit juice is put into a pressure vessel, 40 kg. of solid CO_2 are added, the vessel is closed, and stirring commences. The stirring ceases when the pressure reaches about 7 atmospheres. Fifteen minutes later the product is bottled. This drink is reputed to keep for several months.

Usefulness of whey

Whey contains useful nutrients such as lactose, minerals and B vitamins and is reputed to be therapeutically helpful but it has proved difficult to utilise in a beverage. *Rivella*,[49] a clear yellow liquid with a refreshing, slightly acid flavour, is one drink, however, which has been made from whey. The raw whey is first standardised, the protein is removed by precipitation and centrifuging, and the resulting liquid is pumped into fermentation tanks where some lactose is converted into lactic acid. Further protein precipitation is followed by a certain amount of concentration in a double effect falling film evaporator.

Whey[50] can be made into a human food by concentration, protein precipitation, clarification, cooking with hops, and filtering using activated carbon and centrifuging. The product is clear and has no whey taste or smell, and can be fermented to contain about 1% alcohol, and sugar, fruit juices, Vermouth, etc., may be added. It can also be used in sweet and marmalade manufacture.

CREAM

Cream tablets,[51] individually wrapped in aluminium foil and readily soluble in warm coffee, prove an interesting product from Denmark, particularly useful to airlines, etc. 20% butterfat cream is spray dried once a quantity of lactose has been added, more lactose is added, and then atomised water is passed over it under high pressure to render it "instant." The amount of water is not stated but it is probably just sufficient to transform the anhydrous lactose to the monohydrate, the product granulates and is then sieved to obtain particles of uniform size.

The tablets are then formed at a rate of 200 to 400 per min., dried (at low temperature) and then packed in foil and heat sealed. They are claimed to have a shelf life of three to four months, and contain 2·3% moisture, 37·5% butterfat, 7·0% protein and 50% lactose.

Frozen cream

Frozen whipped cream was prepared on a laboratory scale and then commercially by an American firm,[52] and consumer acceptance was encouraging. The cream is pasteurised, stabiliser, sugar and vanilla added, then it is whipped, packed in polythene bags and frozen at −20°F. After freezing, samples were subjected to different storage conditions and evaluated at one month periods for colour, appearance, flavour, body and texture. Carrageenan No. 2 proved superior to gelatin, Carrageenan No. 1 or dried skim milk as a stabiliser. Body and texture deteriorated when the product was stored for three months.

While on the subject of cream it is interesting to note that the Australian Department of Primary Industry[53] requires that all milk and cream should be filtered at the factory. Fine filtering of cream received attention in Australia and it is advised that nylon filter cloths of pore size 50-100 μ be used. Such cloths can deal with 800 gal. of cream per sq. ft. before clogging becomes a problem.

From here we progress to the processing of cream for "improved" flavour.

Cream,[54] of fat content of 25, 33 or 40%, was allowed to drip into a starter culture contained in a laboratory cultivator and the issuing cream tested for acidity and aroma. The rate of flow required to maintain constant acidity in the outflowing cream decreased with increase in butterfat content. Aroma varied widely and could not be correlated with fat content or acidity of the cream. The distribution of starter organisms was constant during a three hour run. It is considered that continuous cream ripening is a practical proposition.

45% butterfat cream is pasteurised at 90-92°C. with 10-15 min. holding which imparts a pleasant nutty flavour.[55] It is then cooled to 50°C., homogenised and incubated with 10% starter culture, consisting preferably of thermophilic and mesophilic strains of lactic streptococci (strong acid and diacetyl producers) for about 15 hours. The cream is then stirred, cooled to 5-6°C. and packaged in 100 g. blocks, which are aged at 5-6°C. for at least 12 hours before dispatch. The product has a firm consistency, clean lactic taste and smell and should be free of coarse fat and protein particles.

BUTTER

Research on butter and problems encountered during manufacture has continued.

Ascorbic acid enriched butter[56] is made by a continuous process from 83% fat cream with added sugar, honey, cocoa and ascorbic acid, the product being primarily intended for children.

A German patent[57] solves the problem of thick ripened cream by adding salts of high hydrolytic power to ripened cream thus reducing the viscosity. For example, an aqueous solution of 100 g. of K_2HPO_4 or potassium citrate or a mixture of the two (*p*H 8-9) is added per 100 litres of cold, ripened, 45% b.f. cream and the mixture stirred. Within three minutes the cream is as fluid as sweet cream. The patentees claim

that the added salts are eliminated in the buttermilk, and keeping quality is improved.

Continuous butter production

Advances have been noted in the production of butter from ripened cream by a continuous process.[58] A modified Fritz machine can manufacture sweet or ripened cream butter. It is made up of a churning cylinder in which butter grains are formed, a cylinder for separating buttermilk from butter grains, and two working units, in one of which washing can take place. The optimum cream content was 34% butterfat and an acidity of 24° S.H. The fat content of the buttermilk was about 0·4%, and the moisture content of the butter adjustable between 15-18%. The butter is formed and packed, and keeps for six weeks at +10°C.

The Westphalia continuous butter making machine[59] can also churn ripened cream. It contains two churns, a sieve for buttermilk separation, and a working cylinder. 33% butterfat and an acidity of 23° S.H., at 12°C. are the optimum cream properties.

Butter by phase inversion

A totally different principle is applied in the Alfa process[60] for the conversion of ripened cream to butter. High fat cream is made into butter by phase inversion. Pasteurised cream of butterfat 20-40% is pumped through a cream concentrator at 50-60°C., leaving the concentrator with a butterfat of approximately 80%, it is then plate cooled to 17-18°C. Starter culture is injected into the cream and ripening takes place for about 15 hours in a jacketed tank at 18-20°C. The cream then passes into a cylinder where the cream is deep cooled in a thin layer on the cylinder wall, from which it is scraped. It leaves here under pressure and is pumped through a crystallisation tube and finally through a tube of stainless steel balls where it is worked. The next stage is packing. The method claims butterfat of 0·02% in the skim milk and accurate moisture control.

New type of churn

A recently developed German churn of unusual design[61] is reported. It is an Ahlborn churn and comprises a cylindrical tank with two churning elements rotating oppositely and a separate working unit. Butter granules formed in the churn are washed out with water and conveyed to the working unit.

The problem of packing butter is a real one which has attracted some attention in the past year.

A New Zealand firm has developed a bulk butter wrapping, packing and taping machine. A 56-lb. block of butter is check weighed, passes on to the loading platform where it automatically starts the rest of the packing cycle.[62]

Butter box linings, when treated in brine containing 0·5% sodium sorbate,[63] inhibit mould growth without adversely affecting the butter. When the sorbate is added directly to salted and unsalted butter a concentration of 0·05% causes slight off-flavour in salted but not unsalted butter.

Microbiological spoilage

A semi-transparent darkish surface layer[64] of specific smell and unpleasant flavour found on some butter is said to be caused by microbiological and oxidative processes. When salted and unsalted sweet and ripened-cream butters were tested it was found that only sweet cream butter stored at about 6° C. showed the defect. The defect was characterised by rise in butterfat, plasma acidity and in amino N content, as well as decreases in iodine value and the appearance of aldehydes.

Butter made from lipase rich late lactation milk produced in autumn and winter proved most susceptible. Cattle feed containing large amounts of concentrates and sunflower silage favours the formation of this type of milk. Parchment papers and aluminium foil proved to be better wrappers than the paper alone.

An American method called TeSa[65] has been developed for

Mechanisation of traditional Dutch cheese making at a dairy in Holland. (*Left*): Photo shows cheese vats on the upper floor and vats for draining of curd beneath. The drained curd is cut into blocks of required size while moving to the front of the draining vat. (*Right*): The curd blocks are then pressed to obtain the desired form and put in cloth in plastic moulds while moving to the pressing room on conveyor belts. The cheese being made is Edam. The most important Dutch cheeses are Gouda, Edam and Loaf cheese. (*Courtesy "Misset's Zuivel."*)

butterfat determination. It does not use corrosive chemicals, but it is rapid and easy to use and gives close correlation with other methods.

CHEESE

Cheese has attracted fairly widespread attention and there are developments to report in many directions.

Mechanised cheddaring

Mechanisation has progressed considerably. The N.I.R.D.[66] has developed a continuous cheddaring device which has caused wide interest. The method requires fairly simple apparatus which does not occupy too much space. The main essential is a vertical, tapered and hollow cylinder with its wide end, the base, covered with a rotating cutter blade which acts both as a remover of cheddared curd in suitably sized pieces, and a support for the curd column. The cylinder is insulated to prevent heat losses.

Originally, curd separated from the whey was used but the device has been modified to deal with a curd-whey mixture. The tapered cylinder achieves the cheddaring. In operation the first curd produced is not cheddared, but the effect increases, reaching a maximum and continued level once the original column has passed through the cylinder. In order to cheddar the last few pounds, compressed air provides the required pressure. The prototype apparatus handles some 40 lb. of curd per hour which compares with present-day factory production rates of some 15,000 lb. per hour.

American process

The mechanisation of hard cheesemaking receives further notice in an American patent[67] which applies to the part of the process from the time when the curd-whey mix leaves the vat until it is filled into the moulds. An inclined, slowly revolving, elongated drum receives the mixture which is pumped into it, and whey separation occurs, without curd matting or clumping. The curd then passes into a funnel into which salt is fed by a vibrating conveyor belt, and then drops into a vertical, perforated forming tube where the curd mass forms. The mass is then removed from the tube by a slicing device in the bottom of the tube which cuts blocks of suitable size for the cheese hoops.

Dutch process

Dutch mechanisation of Edam cheese[68] means a saving in time and labour. Normal methods of curd forming are employed. The curd whey mixture is pumped on to a perforated draining table where pressure plates expel whey, and the perforated base plates then carry the curd to be cut into rectangular blocks by knives fixed above the table. These blocks are fitted into round moulds and pressed into the conventional shape automatically.

Italian Parmesan machine

An Italian machine[69] which makes Parmesan of improved consistency and which is economical is being used widely. An electrically driven agitator keeps the milk and curds continuously stirred during the heating phases, and is easily replaced by a cutter.

Ultrasonic acceleration of ripening

An American patent[70] describes the application of ultrasonic waves to hard cheese to accelerate ripening. The curd, either in whey or when at the green stage, is treated before ripening with ultrasonic compressional waves of frequency range from 200,000 to 1,000,000 c.p.s. with an energy output of at least 0·05 watt hour/lb. of curd. Direct contact of the curd with the energy source is most satisfactory.

Cheese treated in this way was equal, after six weeks, to conventionally ripened cheese that was five months old. Protein breakdown and free fatty acid formation were accelerated by the process.

An investigation into effects of different temperatures[71] on ripening resulted in the statement that flavour development can be accelerated by ripening at higher temperatures than usual, satisfactory flavour being obtained after 12 weeks by ripening the cheese at 60°F. for four to six weeks and at 40°F. for six to four weeks, or at 75°F. for three weeks and 40°F. for nine weeks.

Other cheese types

Whey cheese (Mysost)[72] can be produced continuously. Fresh whey is evaporated in a vacuum system followed by further very short time evaporation in a special "single flow" evaporator. The whey is then caramelised and made into cheese.

A pleasant smoke flavoured cheese[73] has been produced in America. Cheddar cheese is left for four to six hours in smoke from dampened hardwood dust, weight loss being about 1·9% unless temperatures are allowed to be too high. The cheese can be successfully stored in *Saran* film for several months, particularly if kept under deep freeze conditions. Cheese flavoured in this manner had a better flavour than cheese made with included liquid smoke concentrate.

The Netherlands now produces two new cheeses[74] commercially. They are "Bluefort"—a Gorgonzola type cheese, and "Maestro"—a Bel Paese type cheese, but both with distinctive flavours.

Camembert procedure[75] with temperature and time changes resulted in a semi-soft cheese which was acceptable after three weeks—but with a milder flavour than Camembert.

Packaging

With the sale of rindless cheese and of small packs, packaging materials have attracted interest.

A wrapping material[76] which inhibits surface mould growth and yet prevents "ballooning" has been made in America. The film is made of heat sealable polythene film overlaid by a sheet of regenerated cellulose. This material is claimed to be relatively impervious to oxygen and yet somewhat pervious to carbon dioxide.

A neat package[77] for soft cheese resembles a match box. The cheese is contained in the inner

Automatic cheese waxing. (*Left*): **A semi-automatic waxing machine, cheese travelling from r. to l. at the rate of 90/100 50-lb. cheeses per hr.** (*Right*): **Close-up of an automatic machine, showing cheese about to be lowered into the wax (waxed cheeses travelling to the left).**

box which lacks either top and bottom or both sides in order that the cheese may be examined without disturbing the wrap.

Cheese waxing[78] can be made easier by using one of two machines. An automatic machine has a possible output of 250 cheeses per hour and a semi-automatic machine up to 100 cheeses per hour. Both machines have thermostatic and pneumatic controls. They are also equipped with automatic controls for immersion time.

Setal N 9815 H.V. C/O[79] is a polyvinyl acetate emulsion for the surface treatment of cheese against mould growth. It has a dry matter content of 48·8% and will keep well for a period of two years in a tightly closed container at 20°C. In trials with Edam and Emmental cheese about 500 g. and 230 g. of emulsion respectively were required for a single coating per 100 kg. of cheese. Mould penetration into the cheese during ripening was prevented and surface mould forming on the plastic coat was rapidly removed. Weight losses of the cheese treated with one coating were reduced by about 1% compared with non-treated controls, a second coating resulting in an additional saving of up to 0·5%. The quality of the emulsion-coated cheese was satisfactory.

A German weighing machine[80] with capacity up to 2·5 kg. which automatically and very rapidly calculates the price of prepared portions of cheese is described. The cheese is weighed, the price is electronically calculated and printed on to a label stuck on to each portion bearing the name of the cheese variety and price per kg.

Only the future can show how far the results of these various research investigations will be applied, but if only a small proportion of them are utilised and these come up to the expectations of the authors of the papers quoted, then 1961 should see some notable advances in the dairy industries of the world. Furthermore, other industries should also benefit.

REFERENCES

42. L. R. Mattick, S. Patton and P. G. Keeney. *J. Dairy Sci.*, 1959, **42** (5), 791-8.
43. C. D. Baner, R. M. Marks and E. A. Bernadoni (Borden Co., New Jersey). U.S. Pat. 2,871,123.
44. G. V. Guduason, R. F. Holland and W. F. Shripe. *Amer. Milk Rev. and Milk Pl. Mon.*, 1960, **22** (4), 60, 62, 64, 66.
45. J. C. Musser. U.S. Pat. 2,883,286 (1959).
46. G. Lega. *Mondo d. Latte.*, 1959, **13** (5), 321-2.
47. J. Sulc. *Zravy Vyzkumneho ustavu mlekarenskeho. Praha*, 1959, **7** (1), 8.44.
48. W. Bodmershof. Austrian Pat. 205,328 (1959).
49. *Dairy Ind.*, 1960, **25** (2), 113-7.
50. G. Roeder. German Pat. 1,046,459 (1959).
51. R. Hansen. *Dairy Ind.*, 1959, **24** (11), 895-6.
52. Downs, Doris, Wilkinson, Beverly and T. I. Hedrick. *Quart. Bull. Mich. agric. Exp. Sta.*, 1960, **42** (4), 871-7.
53. G. G. Crittall, L. F. Gunnis, G. S. Pickhaver, I. Howey and G. Loftus Hills. *Aust. J. Dairy Tech.*, 1959, **14** (3), 129-34.
54. J. Masek. *Milchwissenschaft*, 1959, **14** (5), 204-5.
55. V. Butin. *Mol. Prom.*, 1960, **21** (2), 19-20.
56. P. Monets. *Mol. Prom.*, 1960, **21** (2), 20-1.
57. G. Weck. German Pat. 1,053,296 (1959).
58. G. List. *Dtsch. Molkereitztg.*, 1960, **81** (12), 396.
59. W. Wilsman. *Dtsch. Molkereitztg.*, 1959, **80** (52/53), 2065.
60. G. Straube *et al. Milchwissenschaft*, 1960, **15** (5), 210.
61. *Molkerei-U. Kasereiztg.* 1960, **11** (25), 904-5.
62. *Dairy Industries*, 1960, **25** (9), 668, 669.
63. T. Olsson and S. Johansson. *Svenska Mejeritidn.*, **51** (10).
64. A. Lomunov and Yu Khotsko. *Mol. Prom.*, 1959, **20** (7), 32-4.
65. R. G. Washburn. *Olio Fm. Home Res.*, 1959, **44** (321), 84-5.
66. R. T. Budd *et al. J. Soc. Dairy Tech.*, 1960, **13** (3).
67. D. H. Manwaring. U.S. Pat. 2,858,651.
68. *Off. Org. K. Ned. Zuivelb.*, 1959, **51** (44), 930.
69. *Mondo d. Latte.*, 1959, **13** (5), 325-6.
70. W. C. Winder. U.S. Pat. 2,882,164 (1959).
71. T. R. Freeman. *Bull. Ky. Agric. Exp. Sta.*; 1959, No. 666.
72. *Meieriposten*, 1959, **48** (39), 811-5.
73. T. I. Hedrick, L. J. Bratzler and G. M. Trout. *Quart. Bull. Mich. agric. Exp. Sta.*, 1960, **42** (4), 714-21.
74. *Missets Zuivel*, 1959, **65** (48), 1077.
75. T. Tsugo, T. Hayashi and H. Matsucka. *Jap. J. zootech Sci.*, 1959, **29** (6), 345-9.
76. E. W. Kielsmeier and H. J. Duyens. U.S. Pat. 2,882,169 (1959),
77. J. R. Durand. French Pat. 1,174,933 (1959).
78. J. D. Ridgway and J. Roscoe. *Dairy Engng.*, 1960, **77** (3), 74-7.
79. *Mejeritidskr Finl. Svensk.*, 1960, **22** (2), 48-50.
80. H. Ansen. *R. Nord. Mejeritidsskr.*, 1959, **25** (5), 82-3.

Processed Foods for Dogs and Cats

By W. R. Wooldridge,* M.Sc., F.R.C.V.S., F.R.I.C.

Judging by the number of queries received by the editorial office on the subject of pet foods, interest in this subject is widespread and increasing. In this article the author discusses what is known of the nutritional requirements of dogs and cats, and concludes that although feeding of domestic animals is largely empirical and that it is not commercially feasible to cater for the different requirements of every breed, modern processed foods provide balanced diets.

DURING the past ten years, a silent revolution has taken place in Britain in the way in which dogs and cats are fed. Up to the late forties, the principal basis for the feeding of dogs was biscuits plus household scraps and meat drawn from various sources —pieces from the butcher, knacker meat, horsemeat, etc. For cats the routine was milk, again plus household scraps and fish pieces with, in certain cases, the use of cats' meat (usually lights) fairly frequently.

The last ten years have seen this pattern of feeding very much changed, partly because of the great reduction in household scraps and partly because of the introduction of processed and prepacked foods. The make-up of these foods usually takes into account the nutritional requirements of a balanced food, and, as a result, it can fairly be said that the health and general condition of dogs and cats have improved.

The Animal Health Trust has played a part in the development of these new foods by carrying out numerous scientific tests and trials at all stages. It is therefore possible for us to draw certain conclusions as to the reasons for this change in feeding habits and why the general health of the pet population has improved as a result.

DOGS

A large amount of research work has been carried out on canine nutrition, as a result of which the principal nutrient requirements of dogs have been established. These requirements, whilst being basically the same for all dogs, nevertheless vary somewhat with the age, breed, size and function of the dog concerned. For example, the Chihuahua weighs only about 2·5 lb., while the Newfoundland may scale as much as 250 lb. Other things being equal, heat loss is related to surface area, and the surface area-to-weight ratio involved in these two extreme sizes of dog will clearly make their calorific requirements very different per pound body weight. Disregarding, therefore, any variable caused by thickness of coat, the ratio of the body-building protein to the energy providing fat and carbohydrate required for these two breeds will be very different.

* Scientific Director, the Animal Health Trust.

Dogs are adaptable

The activity of dogs will also affect the ratio of protein to fat and carbohydrate that they require. Let us look at the activity of a few different breeds of dogs. The Alsatian and the Terrier need plenty of exercise otherwise they are unhappy and tend to run to fat. The working sheepdog can, and frequently does, cover 75 miles in a single working day. Compare such breeds with the Great Dane in which only a very moderate amount of exercise is called for and which over-exercise can quickly kill. Clearly, the dog which takes a lot of exercise requires a higher calorie-protein ratio than the breed of equivalent size which is not so active.

When a large number of dogs are kept together for a particular purpose, e.g. racing, the dietary balance can be adjusted to suit their requirements, but clearly it is impossible to cater on a commercial scale exactly for the peculiar needs of individual dogs of particular breeds, or even for a breed as a whole. It must be accepted, therefore, that the feeding of dogs is, in general, somewhat empirical, although despite this empiricism, the animals thrive and manage to take a diet which, in few cases, matches their requirements.

This adaptability of the dog may stem from its wild ancestor which, although essentially a carnivore, nevertheless consumed not only the flesh from its prey, but also its bones and the vegetable matter contained in the organs of the gut. Given this adaptability it is, therefore, valuable to have a mixed but reasonably balanced diet provided in processed dog food as a basis for its satisfactory feeding. It may be, and frequently is, desirable, of course, to supplement this type of food with other items at certain times, notably when the animal is subject to particular and unusual stresses and strains such as, for example, breeding and suckling or is indulging in considerable exercise.

So far, we have discussed only the nutritional value of food in relation to the dog's requirements. Other factors, however, are equally important, e.g. acceptability (palatability) and hygienic quality.

Freshness necessary

The Englishman and the American, it is said, differ fundamentally in their attitude to food. The American eats it because he is told it is good for him. The Englishman eats it because he likes it, and the Englishman's dog, in this respect, is very much like his master. However good

the nutritive value of food, it can do no good to the intended recipient if he finds it unpalatable and leaves it on his plate. Extensive studies have shown that freshness, as opposed to staleness or partial decomposition, is of importance in a dog's food, and in this connection pre-packed food generally has a substantial advantage over other forms of diet in that it is usually made from fresh raw materials. In the absence of air, oxygen or microbes, the canned food retains its fresh composition until it is opened.

Because this factor of freshness is so well recognised, manufacturers of processed foods are, to an ever increasing extent, using deep freeze facilities, either their own or those of public cold stores, in order to ensure that their raw materials are as fresh as possible before they are used. Only by such means can the acceptability of such foods be maintained at a high level. From the point of view of hygiene the pre-packed food is the safest that can be bought because heat processing has sterilised it very thoroughly. There is no chance whatever of pathogenic bacteria surviving in canned food.

Feeding tests

In order to assess the value of canned food as a suitable diet for dogs a number of feeding tests have been carried out at the Canine Health Centre with a composite pre-packed dog food representative of many on the market. This food is prepared essentially from meat (largely whale), liver and cereal with a small addition of ground fresh bone. Initially it was fed to a group of 12 Beagles which were able to take unlimited exercise. When given as the only source of nutrient apart from water, the dogs were maintained in excellent condition for a period of two months when fed at a daily rate of 1¼ oz. per lb. body weight. This quantity is rather high, but indications were that it was probably necessary in order to provide adequate carbohydrate.

It was found in a further trial that the addition of cereal in the form of biscuit would allow the level of feeding the processed product to be lowered to ⅝ oz. per lb. body weight and the same dogs were kept for a further 12 weeks on this diet. Again condition was excellent and a bitch successfully reared a litter.

Further experimental work on similar lines has been carried out recently in which a range of dogs (Labrador, Beagle, Samoyed, Terrier, Poodle) has been fed. Again it was found that a level of 1¼ oz. processed food per lb. body weight would keep all these dogs in excellent condition. A Scotch Terrier successfully reared a litter of six pups when fed on this diet alone, without supplement.

There is, therefore, every indication that a good pre-packed food will provide all the basic needs for an adult dog. If it is desired in the interests of economy, it is possible to save protein by the substitution of cereal for a proportion of the processed food. On the other hand special nutrients may be added if desired. For instance, four puppies have been kept on a processed food diet during the period of active growth from weaning to the age of eight weeks with a supplement only of one capsule of *Radiostoleum* per day. Two meals daily, each of ¾ oz. per lb. body weight, were given and condition and growth rates were excellent.

CATS

Although in one way the feeding of cats is very much more simple than the feeding of dogs, in another way it is much more difficult. It is easier because the variability in size of the cat is negligible compared with the extreme variations encountered among dogs. It is more difficult, on the other hand, in that comparatively little information is available on the nutritional requirements of cats. It is, however, known that the cat has a particularly high protein requirement—something over 30%—and a certain amount of information is available on the mineral and vitamin requirements of the cat. Apart from this, the feeding of cats is empirical.

Very much the same goes for the feeding of cats with processed food as in the case of dogs—compromise formulæ have been established which are not unsatisfactory in general use and in which the factors of freshness and acceptability have been capitalised.

Is carbohydrate necessary?

A query which is very frequently raised in connection with the presence of carbohydrate (usually as cereal) in processed dog and cat foods is whether such carbohydrate is necessary or desirable in the feeding of a carnivore. It has already been mentioned that in the wild state both dogs and cats not only eat the flesh and often the bones of their prey, but also consume intestinal contents including vegetable matter. It has also been established that the digestive juices of both dogs and cats contain enzymes which can deal with carbohydrate, which in any case is well utilised by both these animals. There is every reason, then, for using a proportion of carbohydrate in the diet, on both economic and nutritional grounds. The use of carbohydrate as an energy source places much less strain upon the arrangements for the disposal of waste products by the animal than if the protein was itself burned for this purpose. Under modern conditions it would seem that there are many advantages in using properly prepared and balanced processed foods in the feeding of the dog and cat.

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▶ A leaflet issued by the Glass Manufacturers' Federation outlines a scheme for testing in advance consumer acceptance of new containers. This container testing service records and analyses trial results under four different heads—design preference testing, container in use testing, shelf testing and area test marketing—at no cost to the packer, in the case of the first three, beyond the supply of containers, produce, transport and special labels if required; a nominal charge is made in the case of test marketing schemes. Further details of this service can be obtained from the Glass Manufacturers' Federation.

Metal Box demonstrate New Polythene Sack System

Vacuum filling overcomes slip, makes handling easier

METAL Box Co.'s new *Diosack* system was demonstrated recently at their Technical Engineering Division's research unit at Borehamwood. Intended for granular powders, the new pack is a 56-lb. sack in heavy gauge polythene filled in a mould and partially evacuated during heat sealing. This results in a rigid rectangular pack which can be stacked, palletised and manhandled with greater ease than jute or paper sacks and with less risk of damage.

As far as the food industry is concerned, these new sacks are likely to interest handlers of granular foods such as sugar (annual U.K. production requires 23 m. sacks a year), rice, salt, dried peas, lentils, cereals, beans, chocolate crumb and animal feeds. We got the impression that the method is not yet ready for fine powders such as flour.

Multiwall paper sack (*left*), unvacuumised "Diosack" (*centre*) and "Diosack" filled by the vacuum frame method (*right*). All three contain the same amount of polymer granules. Both "Diosacks" reveal their contents, but the vacuum frame filled one is an easily handled package, not a lump.

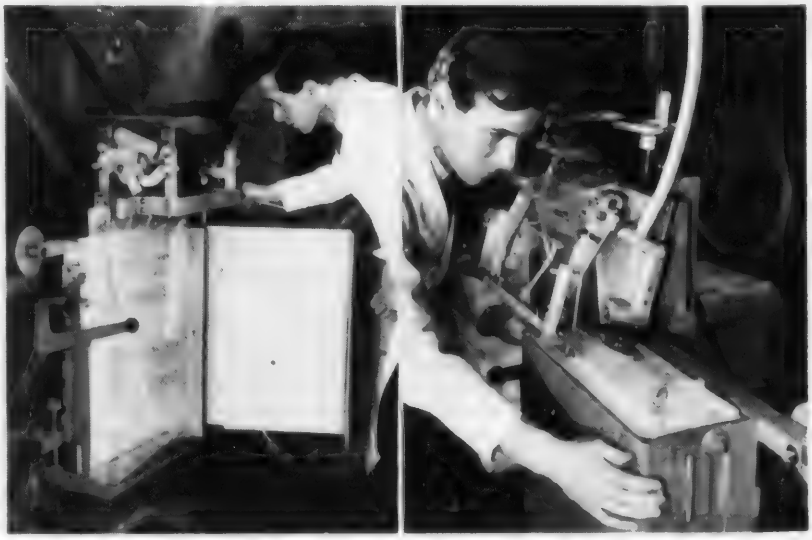
125 sacks of polymer granules, weighing about 3 tons, on three pallets showing the rigidity of a stack of vacuum frame filled "Diosacks."

Figures given by Dr. Swift showed that in this country every year 225 million jute and 550 million paper sacks are used. Metal Box's immediate targets are pow-

(*Concluded on next page*)

How much does it cost?

At present these sacks are costing 1s. 6d. each, rather more than a jute sack of the same size (10d. to 1s. 3d.) and a lot more than a paper sack (3d. to 1s.). Dr. G. Swift, Sales Manager of Metal Box, said however that the cost is certain to come down. Over recent years polythene flake has been steadily coming down in price, a trend which is likely to continue; another point is that the present thickness of the polythene, 10 thou., may soon be reduced to as little as 6 thou. when stronger material, now being developed, becomes available. This will bring the price down even more.



(*Left*): **A "Diosack" held in position on the hopper by the clamp before the door of the frame is closed.** (*Right*): **The filled "Diosack" in the frame approaching the vacuum probe and sealing jaws. When the right amount of vacuum has been drawn the action of closing the heat sealing jaws automatically withdraws the probe.**

ADVANCES in FOOD TECHNOLOGY

ANALYSIS

Determination of proteins in flour and wheat

A colorimetric method for the determination of protein in wheat and flour is described: its application to the routine analysis of these materials has been studied from several technical and chemical aspects. The method has been found to posses certain economical and practical advantages over the Kjeldahl method, whilst the results obtained show excellent correlation with those obtained using the latter procedure.—P. C. Williams, *J. Sc. Food Agric.*, 1961, **12**, 58.

BREWING

Detecting chillproofer protease in beer

Chillproofer protease present in beer during cellar processing can be detected by its action on photographic film at 40°C. Various films currently on the market are suitable for use in the test, although they differ in the time required for the gelatine emulsions to be digested away.

Beer appears to activate the chillproofer protease in this test. The mechanism of this activation has not been completely explained.

The test is applicable to malt infusions.

A quantitative adaptation of this test is being developed.—P. R. Glenister and M. Burger, *The Brewers' Digest*, 1961, **36**, 52.

FLAVOUR EVALUATION

Effect on number of judgments in a test

Four products—canned peaches, hamburgers, tomato juice, and green beans—were scored for preference by a panel of 175 to 191 untrained flavour judges. The 20 samples of each product were assigned to four trays and judged in one continuous test period. The order of presentation to the judges was assigned so as to have each tray tested in each possible order an equal number of times. It was assumed that the preference differences for the samples on a tray were flavour differences. Results on tomato juice indicated the judges had a lower ability to detect differences among samples on the first tray than when the same samples were served on succeeding trays. On the other three products tested (green beans, hamburger, and peaches), tray order did not significantly affect the ability of the judges to descriminate between samples. This indicates that for mild products, such as included in this test, up to 20 samples may be included in one test period with no decrease in the judges' ability to discriminate flavour preferences among samples.—L. A. Sather and L. D. Calvin, *Food Technology*, 1960, **14**, 619.

DOUGH MAKING

Measuring improver response in dough

Structural relaxation data were obtained for doughs containing initially 0, 10, 15, and 20 p.p.m. bromate and allowed reaction times of 1, 2, and 3 hours. When the semiaxis constant for the bromate effect was plotted against reaction time, linear plots were obtained. Analogous linear plots were also obtained when the amounts of bromate reacted in dough as determined chemically was plotted against reaction time. The amount of change in the semiaxis constant per unit amount of bromate reacted was taken as a definition of bromate response. The response was evaluated for several flours. Improver response was also obtained from similar data with iodate.—I. Hlynka and R. R. Matsuo, *Cereal Chemistry*, 1960, **37**, 721.

MEAT PROCESSING

Importance of Carbohydrates

Although meat and meat products do not contain sugar in such quantities as to play a significant part in human nutrition, the carbohydrates are nevertheless of essential technological importance. When used as auxiliary curing agents, they show biological, chemical and physical effects. They are also able to influence the flavour of meat products, both directly and through certain reaction products; as such, they are also able to cause discoloration. In the form of poly-saccharides, carbohydrates are also suitable as bonding agents.—O. Prändl, *Die Fleischwirtschaft*, 1961, **13**, 49.

New Polythene Sack System

(*Concluded from previous page*)

dered milk (present usage is 2 m. sacks/year costing 1s. 4d. each) and seeds (12 m. jute sacks at 1s. each is present usage).

Advantages claimed

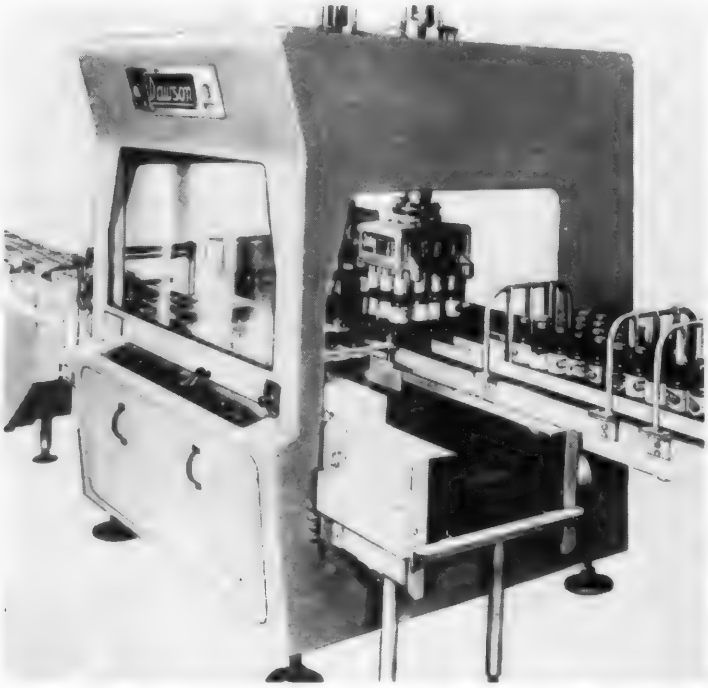
Although polythene has a greater coefficient of friction than paper, a grave disadvantage of ordinary polythene sacks is that the air entrained inside forms a cushion, causing stacked sacks to slip. The new system does away with this because there is no air cushion and the evacuated sack clings tightly to the contents, imparting considerable rigidity. Various test figures were produced to show that in standard drop tests the vacuum-filled *Diosacks* came out better than multi-wall paper sacks or straight-filled polythene sacks.

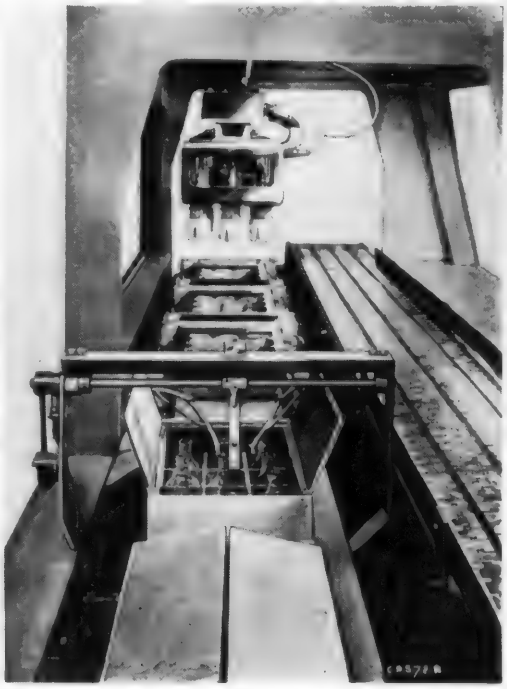
Method of filling

The demonstration set-up comprised a hopper and gravity weighing device, a rectangular frame in which the sacks were held and a heat sealer. The latter had a vacuum pump and probe connected which lowered the pressure in the sack by about 10 in. of mercury at the moment of sealing. The company say that a higher vacuum is unnecessary and indeed undesirable. Even though punctured, it is claimed, stacked sacks will retain their shape and not slip.

Sacks come with about three-quarters of the top edge already heat sealed, leaving a quarter for filling. Each sack is put into a rectangular frame which holds it during filling. The sack is blown to the shape of the frame by compressed air. Filling presented no problems and conventional equipment can be used; Metal Box will loan interested parties the necessary equipment to start with, which can later be bought or rented. The demonstration unit, necessarily rather primitive, had an output of about six sacks in 5 min. The company are developing an automatic multi-head unit for much greater outputs.

After filling, the frame with filled sack inside is moved to the vacuumising and sealing stage, the probe inserted, the vacuum drawn, and sealing carried out. The probe is automatically withdrawn by the closing action of the sealing jaws.





(Left): **The Dawson automatic machine for unpacking bottles from cartons.** *(Right):* **A close-up of the Dawson unpacking machine, showing it handling cartons with flaps. The special plough arrangement can be seen turning the flaps back as the carton reaches the unpacking position.**

AUTOMATIC DECRATING MACHINE

An adaptation of Dawson Bros.'s decrating machine, a fully automatic carton unpacking machine, said to be the only one designed and manufactured in Great Britain has been introduced. On the bottling lines, which have an output of 9,600 bottles per hour, bottles are taken from the cartons, moved horizontally to the release position and lowered gently on to the conveyor belt which bears them along to the bottle washing machine, after the stoppers have been removed. Machines with single, double or triple heads can handle up to 24 cartons per minute and can deal with any range of bottle from ⅓ pint to a quart and ¼ litre to a litre. Adjustments enabling the machines to be changed from handling one bottle size to another in a matter of minutes are supplied and can be fitted also on the conveyor to suit different sizes of cartons. All parts of the machines are easily accessible for routine checking and maintenance.

DRYER

The Holmes-Kemp dryer made by W. C. Holmes and Co., Ltd., is designed to give continuous moisture extraction from air or other gases, operating on a pre-set cycle, the period of drying being followed by one of heating, then cooling to drive off the adsorbed moisture. Twin towers enable continuous drying to be carried out, one tower always being in the process of reactivation while the other is drying. Pre-filters are fitted where the gas to be handled is laden with oil mist or other impurities likely to impair the life or efficiency of the drying agent. The dryer may be arranged for either steam or electrical reactivation and in each case the heaters are so constructed as to give easy access to heating elements for any servicing that may be necessary. The construction of the towers is based upon full area flow and they are independently valved, so that either tower can be completely cut off from the remainder of the system for inspection and servicing purposes.

DUST COLLECTION PLANT

Holmes-Elex electrical precipitators made by W. C. Holmes and Co., Ltd., have been specifically designed for the removal of extremely small particles (in the sub-micron range) from all types of carrier gas. The particles, either liquid or solid, are separated by passing the contaminated gas through a high voltage electrical discharge which imparts a negative charge to the particles and then deposits them on to collecting plates.

The removal of all particulate matter, ranging from approximately 60 microns to ·001 microns in size, from air and gas streams can be readily achieved by the use of an *Industrion* electrical air filter. This filter can be used for all forms of air filtration and it can be installed in any type of ventilation system to operate in conjunction with other air handling plant. Capacities of installations completed in the United Kingdom range from 250 c.f.m. to 200,000 c.f.m.

The Holmes-Schneible multi-wash system can be applied to a wide range of dust collection and control problems involving liquid and solid particles. This collector has many advantages over other types of collector; it has an extremely high efficiency (of the order of 99% for all particles above 3-4 microns); it has a lower pressure drop than many other types of wet washers and an absence of circuit restrictions which might cause blockages.

Holmes-Rothemuhle multi-cell cyclone dust collectors are used for the collection of dust and grit particles in the higher size ranges (10 microns and above). In addition to the advantages of low installation, operating and maintenance costs, these collectors have the advantage of space saving construction which enables them to be easily fitted into existing flue gas ducting.

A machine for topping and tailing onions, made by Wm. Brierley, Collier and Hartley, Ltd.

ONION PREPARING MACHINES

The onion topping and tailing machine, which can be fed at the rate of 70 onions per minute, results in a saving of both floor space and labour costs, as only a quarter of the staff previously employed are needed, a day or two's practice being necessary to operate the machine with ease. William Brierley, Collier and Hartley, Ltd., have patented the machine which was first made to deal with pickling onions of 1⅜ in. average diameter, but is now being manufactured to deal with onions of 3½ in. and 5 in. diameter. The machine works with the minimum of attention and maintenance, calipers each onion on its axis and removes from each only the required amount of top and tail, adjustment being easy when changing over from one batch of onions to a different type.

Improvements to their onion peeling machine have been made by the same company. A stone disc, said to be "kinder" to the onion is now used instead of the carborundum previously applied, and a new type of easy-ride deflector is now fitted.

CONSTANT RATE FEEDER

A constant rate feeder, the *CRF/J*, recently produced by the Watson-Marlow Air Pump Co., is designed to dispense broken solids, granules, flakes, wet and dry powders, pastes, sludges, etc., at a constant volumetric rate. An accuracy of weighing within about 1½% is claimed. A rotating table is situated beneath a fixed hopper throat, with an aperture in its base: hinged on one side of the aperture is a blade which projects through it towards the centre of the table and beyond. Material falls down the hopper throat on to the central portion of the table, the rotation of which causes the material to travel

The CRF J constant rate feeder for feeds of a few grains min. up to a ton hr.

along the blade, through the aperture and out over the table edge. Delivery rate is coarse controlled by the angular setting of the blade, which governs the size of the throat aperture, and fine controlled by the speed of the table rotation, which is infinitely variable over a range of 9:1, generally between 10 and 90 r.p.m. The manufacturers say that feeds ranging from a few grains per min. of fine materials up to a ton per hour of heavy materials are obtainable on the one unit.

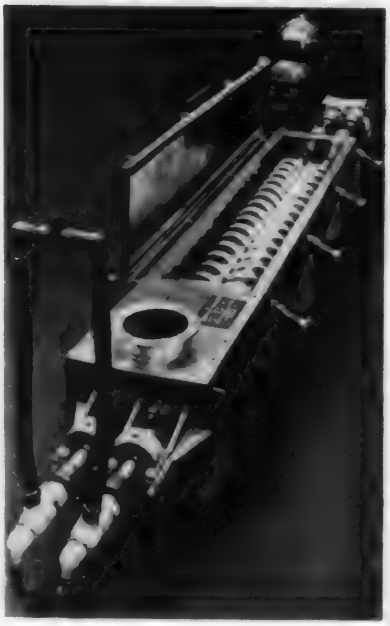
INDIRECT HEAT EXCHANGER

The *Holo-Flite* processor made by Holdan Engineers (London), Ltd., is a continuous indirect heat exchanger that combines maximum heat transfer area with minimum space requirements. Being designed as a screw conveyor with helical, hollow flights through which the heat transfer agent is circulated, it conveys the material to be heated, cooled or dried at a uniform, pre-determined rate. The heat transfer agent is completely isolated from the material being processed and heat is transferred to or from the heat transfer agent by contact with the hollow flights. The feature of intermeshed rotating screws causes the particles of material within the mass to be subjected to continuous movement by the flights and in constantly changing position they make frequent contact with the heat transfer surfaces.

DISTILLATION UNIT

The latest addition to the range of apparatus available from QVF, Ltd., is a "packaged-unit" 100-litre capacity distillation unit for use with steam or electrical heating. Charging and take-off can be by atmospheric or vacuum operation, while the reflux can be manually or electrically controlled. The distillation unit, a general-purpose still, is delivered complete with structure and electrical contact gear, and the unit is ready for operation when water and vacuum services are connected. Similar units of 50 and 20-litre capacity will also be produced by the company.

▸ Jackson Bros. (of Knottingley), Ltd., in their quarterly house journal, discuss some of the factors that govern the form of the modern glass container and report on the increased demand for glass containers demonstrated at the recent Interpak Exhibition at Dusseldorf.



A "Holo-Flite" processor model 1D78-4 in.

PACKAGING

Flat form chocolate boxes

Boxes which can be supplied to chocolate manufacturers in flat form have been developed by Reed Cartons, Ltd. They are made of white lined chipboard which can accept directly the six colour illustration printed by the manufacturer on the self-locking, flange lids. The storage space is fractional compared with that needed for rigid boxes, and machines are available which can speedily erect the flanged boxes.

Cold sealing cuts packaging costs

A variety of packaging materials coated with a substance which sticks only to itself and then only when a predetermined pressure is applied will soon be supplied by Samuel Jones and Co., Ltd., under agreement with a Swedish firm. Almost any package hitherto heat-sealed can be produced more quickly and thus more cheaply, the machine being cheaper to buy and install and easier to use. Heat-sealing takes time and the equipment, not only being expensive to install, must be carefully controlled and maintained.

Cohesive materials are sealed as fast as their surfaces can be brought together and the machine is ready to run at the touch of a button. As well as the advantages of speed and ease of use these materials are odourless and non-toxic and can be made to resist the passage of moisture-vapour or gases or to permit the use of ethylene oxide for sterilisation of contents after packaging.

This polystyrene vinegar bottle has a drip pourer and a specially shaped neck to prevent drips running down the outside.

A selection from the range of chocolate boxes, supplied in the flat, which have been designed and manufactured by Reed Cartons, Ltd., for the Stardust Confectionery Co.

Decorative vinegar bottle

A new pouring device has been incorporated in the Sarson's polystyrene vinegar bottle which comes on to the market this month.

Under an easy-to-replace, push-on white polythene cap, a drip pourer enables the exact amount required to be added to food. For more liberal helpings, the drip pourer can be removed.

A curved neck in the bottle is designed to prevent drips on the outside of the bottle.

The bottle, designed and manufactured by Pioneer Plastic Containers, is in maroon with a crystal clear base that enables one to see when vinegar supplies are running low.

Printed low-tack vinyl tapes

Low tack vinyl tape was developed as a protecting medium for highly polished and finished surfaces, either during further processing or during storage. As such it is known as " vinyl protection tape " and is becoming widely used in the engineering industry, being available in widths from ½ in. to 24 in.

It was discovered that this material had many applications outside the engineering field, where its low tack characteristics were in demand for special applications, for example, in banding printing display cartons where the tape was required not to "lift " and damage the printed surface.

Printed tapes are used extensively for banding together tins and packs subject to premium offers. So far normal tack cellulose and vinyl tapes have generally been used, but because of their high tack, these tapes remove part of the printed surface from the pack or tin label and while, for obvious reasons, it may not always be desirable that the banding tape should be capable of removal without leaving an obvious mark, it may, nevertheless, be of value in some cases.

Low tack vinyl tapes made by Paynes Jiffytape, Ltd., can now be supplied printed to customers' require-

This sponge mixture carton is overwrapped with a lacquered foil and MXXT/S " Cellophane " film laminated together with a tear-tape incorporated.

"Dioform" cartons made by Metal Box for Eskimo Foods.

ments, and are available in one or two colour prints in widths from ½ to 2 in., as well as in 97 yd. rolls.

Sponge mixture pack

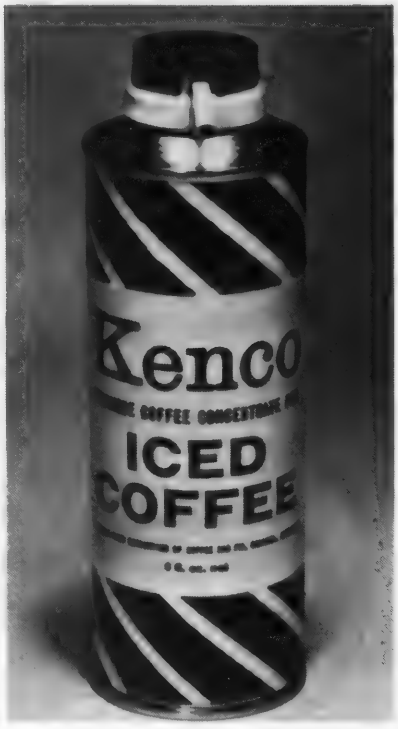
A carton claimed to be 10-15 times more moisture-proof than the paper liner and carton previously used has been put on the market by Green's of Brighton for their chocolate sponge mixture. The pack is overwrapped with a lacquered foil and MXXT/S *Cellophane* film laminated together, is odour and grease proof and ensures an increased shelf-life. The wrapper has good handling properties on a wrapping machine. A teartape is added, affixed in such a way that it can be removed cleanly without disfiguring the printed information on the back of the pack.

Cartons for fish cakes

New cartons for fish cakes made by Eskimo Foods, Ltd., are supplied by the Paper Group of the Metal Box Company, Ltd. The packs are manufactured in the top-opening *Dioform* style.

Dioform cartons are supplied in the flat, cut, creased and dry waxed with a thermoplastic adhesive applied. The base of the carton is then set up on Metal Box machinery and the corners heat sealed. The top of the carton is the conventional tuck-in type.

The surface decoration, to the customer's design, is printed in four colours by offset lithography.



Kenya Coffee Co. have now produced their Viennese coffee concentrate in this aerosol container made by Metal Box. The equivalent of one teaspoon is squirted into a glass of chilled milk.

Dual purpose transit case

Newest of the Kellogg's cereal food transit cases to be produced by Reed Corrugated Cases, Ltd., can be easily converted by the retailer into a sales dispenser and display stand.

Cut round a printed indicator line, the top half of the case can be removed, reversed and inserted into the lower half. Step-by-step illustrated instructions printed on the top flaps show how it's done. The cartons of cereal are kept at least 12 inches clear of the floor and free from dust and damp in this hygienic form of dispenser.

The corrugated fibreboard case is constructed on the one-piece principle and employs an extended glued lap manufacturer's joint.

These seasonal Easter egg cartons are made by Reed Cartons, Ltd., and were submitted to tests in which a very low breakage rate was recorded.

OBITER DICTA

● Year by year the cow converts grass and feeding stuffs with such incredible efficiency as to cause embarrassment.—*Financial Times.*

● Judging by the big increase in the number of fruit trees, Oslo must be in the process of becoming a blooming orchard.—*Press handout.*

● Very soon every household in Britain will be able to have dehydrated water delivered to the door for no more than a trifling extra cost. You just add water to it—and there you are!—*Peter Simple in Daily Telegraph.*

● "It doesn't take long to get a cup of tea at Cannon Row Police Station, does it?"—Mr. Victor Durand, Q.C., to police witness. Witness: "Oh, no, sir, we're very well organised. About two minutes."—*Peterborough, in Daily Telegraph.*

● The fairy tale "The Emperor's New Clothes" might never have been written if there had been a consumer council in olden times. With present-day commodity declarations attached to the cloth the Emperor would not have been so pitifully duped. —*Norwegian Minister for Family and Consumer Affairs.*

● Quite recently in a factory, where my own company installed various machines, some gentry employed on the night shift brought a fork lift truck to bear on a large and expensive machine and by gently rocking it secured free delivery of the entire contents.—*M.D. of vending machine company.*

● American slang terms for restaurant orders are many, varied and always colourful. They include "dropped eggs" for poached eggs, B.L.T. for bacon, lettuce and tomato sandwich, "covered wagon" for beefsteak pie. Now comes another, which could alarm an unseasoned traveller from Britain. It is: "Burn the British!"—in other words, toasted English muffins.—*Daily Telegraph.*

● The Buxted Chicken Co. has decided not to emblazon its new slogan "Yours tenderly" on the back of its fleet of vans and lorries. Instead the message reads: "For the family." A Buxted official explained. "The thought of a stream of cars stuck in a city traffic jam behind a lorry bearing the words 'Yours tenderly' was really too painful. We feared that irate motorists might see something ironical in the situation."—*Press handout.*

NEWS DIGEST

Labelling and solvents to be reviewed

The Food Standards Committee is to undertake a review of the Labelling of Food Order and of other food regulations, not, however, at present being concerned with advertisement. The committee would welcome written evidence from interested organisations on matters within the scope of this review.

A review of solvents and flavouring agents will be undertaken shortly by the Food Additives and Contaminants Sub-Committee of the Foods Standards Committee, who will advise Ministers on the need for regulations to control the use of these substances in the preparation of food. The sub-committee would welcome information from interested bodies as to the solvents and flavouring agents, at present in use. Evidence should be sent to the Joint Secretary, Foods Standards Committee, Great Westminister House, Horseferry Road, London, S.W.1, not later than May 4, 1961.

International glucose relationship

A relationship whereby technical information will be interchanged has been entered into by Staley A. G., of Switzerland, Tunnel Glucose Refineries, Ltd., of Greenwich and Glucoseries Reunies S.A. of Belgium, who all manufacture glucose, starch and other corn products. Under this arrangement the former company, a subsidiary of A. E. Staley Manufacturing Co. of Illinois, has acquired a minority interest in Tunnel Glucose and a financial interest in Glucoseries Reunies.

Improvement of slaughterhouses

The councils of 120 local authority districts are now debarred by legislation from granting or renewing licences for any slaughterhouse premises unless they are satisfied that all the construction requirements as to hygiene and humane slaughter will be satisfied when the licence comes into force. Before the war there were about 12,000 slaughterhouses in the country, most of which were unsuitable for modern standards of hygienic practice; all but a few hundred of these were closed during the war. In 1956 the government announced a policy under which all slaughterhouses would eventually have to be brought up to modern standards and the Slaughterhouses Act of 1958 laid down the standards to be attained and the procedure for bringing this about.

Frozen food producers' annual general meeting

The retiring president of the National Association of Frozen Food Producers presented at the annual general meeting the chairman's report, which included statements on membership, weights and measures legislation, industry statistics, fish levy, standardisation of sizes and packs and tariff application. Mr. Mitchell, who remains general secretary of the association during 1961, is moving his office to 4 Lygon Place, London, S.W.1.

New emulsifying agent

A completely new emulsifying agent, *Rivallo*, has been added to their range by Advita, Ltd., who say that it is a natural development from *Rival*, their plastic emulsifier introduced 2½ years ago. The new product is a blend of *Rival* and refined deodorised lard, and when used in bread or fermented goods the mixture is claimed to confer the advantage of high quality lard plus the emulsifying properties of *Rival*.

The new agent is sold ready to use.

New projects in Northern Ireland

Batchelors Foods, Ltd., Associated Feed Manufacturers, and J. Bibby and Sons, Ltd., are among the sixteen British firms who have decided to establish themselves in Northern Ireland. Thirteen other firms already in Northern Ireland have embarked on expansion schemes.

Conference on materials handling

The second International Conference organised by the Institute of Materials Handling will take place in Southport from May 10 to 12. Information from Institute of Materials Handling, 32, Watling Street, London, E.C.4.

Ulster broilers for Britain

Large-scale production of broiling chickens for the British market is to start in Northern Ireland.

A new company, Banside Chicks, Ltd., is being formed with a capital of £60,000 and has been allocated a Government advance factory of 18,000 sq. ft. at Dromore, County Down.

The broiler processing plant, one of the most efficient in the U.K., will have an eventual throughput of 100,000 birds per week, with a target employment of 150 people. The Ulster company will be allied to one of the largest selling organisations in Britain.

The new project is necessary to process the increased supply of broiler chicks resulting from the large number of producer groups now being formed in Northern Ireland.

Dairy Engineering Exhibition, 1963

The Dairy Engineers' Association is to sponsor a new exhibition—the Dairy Engineering Exhibition—to be held in the National Hall at Olympia, London, from January 28 to February 1, 1963. The exhibition will be organised by the Trades' Markets and Exhibitions, Ltd., Grand Buildings, Trafalgar Square, London, and will cover industrial dairy plant and machinery and ancillary equipment.

Every year Birds Eye Foods holds an efficiency competition between their five factories, the winner being awarded the Chairman's Challenge Cup. Current winners are the staff of the Lowestoft factory, whose factory general manager, Mr. T. W. G. Crawford, is seen holding up the cup presented by Birds Eye chairman Mr. J. R. Parratt.

Review of Colouring Matter in Food Regulations

The government is to review the permitted list of colours in the Colouring Matter in Food Regulations, 1957, and the Colouring Matter in Food (Scotland) Regulations, 1957.

Proposals for additions and deletions of permitted colours, stating the reasons, should be addressed to the Assistant Secretary, Food Standards Division, Ministry of Agriculture, Fisheries and Food, Great Westminster House, Horseferry Road, London, S.W.1, or to the Secretary, Department of Health for Scotland, St. Andrew's House, Edinburgh 1, to arrive not later than July 31, 1961.

Lecture course on drying

A course of ten lectures on "Drying" will be given at the National College building, Southwark Bridge Road, London, S.E.1, on Monday evenings, commencing April 10, 1961. The fee for the course is £1, payable to the Clerk of the Governors, National College for Heating, Ventilating, Refrigeration and Fan Engineering, Borough Polytechnic, Borough Road, London, S.E.1.

Changes of address

The National Association of Frozen Food Producers have moved to 4, Lygon Place, London, S.W.1. Telephone: SLOane 9903/7.

A number of administrative departments of T. Wall and Sons (Meat and Handy Foods), Ltd., have transferred their offices to 59/61, Park Royal, London, N.W.10. Telephone: ELGar 5722.

New Simon member

Simon AMF, Ltd., a new member of Simon Engineering, has been incorporated to design, sell and install a complete range of bakery equipment throughout the world.

Ross Frozen Foods

All export and shipping business of Ross Group, Ltd., is now dealt with by Ross Frozen Foods from Export and Shipping Dept., Grimsby.

F.A.O. fellowships

F.A.O. has announced that it will offer 10 or 12 Andre Mayer Fellowships in 1961 for research and research training. The subjects presented must be in relation to F.A.O.'s activities and not more than one or two applications may be submitted by each member government of F.A.O. The government can sponsor only candidates of U.K. nationality. Further information can be obtained from the Secretariat of the F.A.O. National Committee for the United Kingdom, Ministry of Agriculture, Fisheries and Food, Whitehall Place (East Block), London, S.W.1. and the closing date for the receipt of application forms is April 30, 1961.

Produce and Prepackaging Development Association

At the annual luncheon of the Produce and Prepackaging Development Association, Ltd., the chairman, Mr. F. T. Hussey, said that membership had considerably increased during 1960 and that many of the difficulties facing the Association last year were now resolved. He also referred to the weights and measures bill now before Parliament and commented on the National Standards Scheme for prepacked potatoes. The guest speaker was Mr. N. B. Smiley, government appointed member of the British Egg Marketing Board, who ended his speech with the hope that the close relationship between the Board and the P.P.D.A. would go on for many years.

Mr. E. W. Rodd (right), *chairman of T. Wall and Sons, Ltd., is a keen rose grower, and every year he is presented with a rose bush by the "Knights of the Roads," association of Wall's night supply drivers. This is the eighth, presented by Mr. Victor Kent, this year's chairman of the "Knights."*

Publicising British industry overseas

A party of industrial representatives, visiting the headquarters of the Central Office of Information recently were invited to use the international information services provided by the government to publicise their companies. The services include the written word, photographs, films and recorded tapes for radio stations. Information officers, using their knowledge of conditions and requirements in their territories, place the material where it is most likely to achieve the best result. In this connection it is interesting to note, that the C.O.I. have at various times republished abroad articles in FOOD MANUFACTURE, particularly factory articles.

Frozen food producers elect Smedley for President

The Chairman of the National Canning Co., Ltd., and Smedley's, Ltd., Mr. W. V. Smedley, has been elected president of the National Association of Frozen Food Producers, which represents over 90% of the total frozen food production in Great Britain. At the luncheon of the Association the guest of honour was H.M. Minister for Agriculture, Fisheries and Food and, in all, there were over 60 persons present representing all sides of the industry.

Courses for works and plant engineers

A series of courses including sessions covering a short revision of combustion principles, maintenance of boilers, mechanical stokers and firing equipment, and the choice of suitable fuels has been announced by N.I.F.E.S. There will also be a comprehensive introduction to the latest combustion equipment and automatic controls that are now available to industrial and commercial solid fuel users. The first course, starting on Monday, April 10, 1961, will finish on Friday, April 14, 1961, and will take place in Manchester. The fee is 12 guineas and enrolment forms and a syllabus may be obtained from N.I.F.E.S., 71, Grosvenor Street, London, W.1.

New Simon flour plant for Edinburgh

Another contract has been awarded to Henry Simon, Ltd., for a complete bulk handling and storage plant for flour, granulated sugar and wholemeal. The new plant with intake from bulk road vehicles, redressings, sieves, dial batch weighers with Select-O-Weigh automatic control will be erected at the Edinburgh biscuit factory of McVitie and Price, Ltd. Work on the project is expected to be completed early in 1962.

Food in Parliament

Call for marking of milk cartons

The quantity and quality of milk should be printed on the cartons supplied from milk-vending machines, an M.P. declared in Parliament. He also called for steps to be taken to ensure the cartons did not leak. Mr. Christopher Soames, Agriculture, Fisheries and Food Minister, said the law already required cartons to be marked with the designation of the milk they contained. Since milk could only be packed for retail sale in half pints or multiples of half pints, it had not been thought necessary hitherto for the quantity to be marked on the container, but the new Weights and Measures Bill provided that three years after it became law all pre-packed milk would have to be marked to show quantity. He was confident that dairy firms were aware of their responsibility to ensure that cartons did not leak and no action on his part was needed.

"Congo" beef to be sold

Eight thousand tins of corned beef, originally set aside for the people of the Congo but later found to be not needed for famine relief, were being disposed of through Government channels and the proceeds remitted to the United Nations.

This was stated by a Government spokesman when M.P.s inquired into the circumstances in which the corned beef was left for some months on an R.A.F. airfield in Britain.

Meat research

The Government's main proposals for extending meat research were still under examination, said Mr. Denzil Freeth, Parliamentary Secretary for Science. But plans had been made to set up a small laboratory in association with an abattoir near Cambridge, at which the work done at the Low Temperature Research Station could be continued and expanded.

Fuss over pet meat

A complaint that canned meat for dogs and cats was being sold in ordinary grocers' shops along with other canned meat and that no attempt was made to mark on the tins that it was unfit for human consumption was made by Mrs. Elizabeth Braddock, Labour M.P. for Exchange, Liverpool.

Mr. William Vane, Parliamentary Secretary to the Ministry of Agriculture, Fisheries and Food, said the descriptions on the tins, and the pictures of dogs and cats normally shown on the labels, should be enough warning to purchasers of what the contents were intended for. Meat for dogs and cats was sterilised in the process of canning. The Ministry had no power to compel manufacturers to mark the labels "Unfit for Human Consumption."

Frozen bread?

Mr. Vane said it had not been established that there would be any economic advantage in selling bread in frozen form, but the Food Research Advisory Committee, which was carrying out a general survey of food research needs, had been asked to consider whether public funds should be made available for further research into the possibility.

Mr. Norman Dodds, Labour M.P. for Erith and Crayford, said the U.S. Government had been financing surveys on the practicability of selling frozen bread and the results had shown several advantages, also the possibility of a reduction in price.

New public cold store at Hornsey, London

A new 143,000 cu. ft. public cold store for meat and poultry at 15 Tottenham Lane, Hornsey, London, N.8, has recently been completed for Green's Cold Stores by Smiths Insulations, Ltd., who were responsible for the steel structure, all building work, and insulation and refrigeration plant. Insulation comprises 10 in. of expanded polystyrene on walls and ceiling and 10 in. of cork on the floor.

Eskimo Foods expansion

Expansion of both Eskimo Foods, Ltd., and their distributors, Neilsons (Ice-cream and Frozen Foods), Ltd., has resulted in arrangements being made for Eskimo to set up their own distribution organisation. Neilsons will continue to give Eskimo their full support during the transition period, which may take two to three years.

A fork lift truck was put to this unusual use when TV. cameramen went to the preserve works of Wm. Moorhouse and Sons, Ltd., for a production of the show "Sing Along with Joe."

British plant for Jugoslavia

A complete plant for the manufacture of dehydrated vegetables worth £63,000 is to be made for a Jugoslav organisation by Mather and Platt, Ltd. The agents are Adam and Harvey, Ltd., whose subsidiary Lamet Delifoods, Ltd., will market the products of the new plant when it starts operating in the late summer of this year.

Bakery equipment makers meet

At the twenty-sixth annual general meeting of the Bakery Equipment Manufacturers Society held in London in March, the retiring members of council, Mr. G. R. George and Mr. A. E. Kent were re-elected. Mr. J. N. Palkman as chairman and Mr. F. F. Fox as vice-chairman were appointed.

Forthcoming Meetings

S.C.I. Food Group, 14, Belgrave Sq., London, S.W.1; Wednesday, April 12, 18.15: Nutrition Panel a.g.m. Monday, April 24, joint meeting with Royal Society of Health at Blackpool (*q.v. below*). Friday, April 28, 19.00, joint meeting with South Wales Section at University College, Cathays Park, Cardiff: "Modern Food Legislation in relation to Food Additives" by C. A. Adams.

Royal Society of Health, 90, Buckingham Palace Road, London S.W.1: Monday to Friday, April 24-28, Health Congress at Winter Gardens, Blackpool (charge for admission tickets £4 14s. 6d.).

S.C.I. Microbiology Group, 14, Belgrave Sq., London, S.W.1: Thursday, April 27, 18.00: a.g.m., followed by address on "Recent Microbiological Problems in Industry" by H. J. Bunker.

Plant Phenolics Group, Low Temp. Research Station, Downing St., Cambridge: Monday to Wednesday, April 10-12, "The Importance of Plant Phenolics in Industry."

OVERSEAS NEWS

New Swedish Preservation Method

A new and inexpensive method of food preservation is at present being developed by two Swedish researchers, Professor Ragnar Nilsson and Agronomist Conrad Rydin of the Royal Agricultural College, Uppsala, according to press reports. They have obtained a grant of Kr. 64,000 (£4,415) from the Wallenberg Foundation for further experiments.

The method, which is applicable for fish and meat and also for ensilage of green fodder, is based on the interaction of lactic acid bacteria and certain enzymes which break down the carbohydrates.

The outcome of this biological process is the formation of lactic acid, which ensures quick preservation of the foodstuff.

Unilever takes over Australian ice cream firms

In Australia Unilever have taken over the big ice cream concerns of Streets and McNivens. Chairman of Streets is Mr. W. D. Phillips, who spent a few weeks with Wall's in this country in November and who, with two other directors, members of the original Streets family, will remain on the board. They have two factories in Sydney and one in the North, towards Queensland. Australia is already very ice cream conscious, and it is likely that the product will become even more part of the everyday home menu in the next few years.

Rhodesian milling development

The Rhodesian Milling Co. (Pvt.), Ltd., are remodelling and extending their offices and installations in Bulowayo, to allow for any future expansion.

Malaya/New Zealand agreement

Under the terms of their first trading agreement coming into force for 3 years, New Zealand undertakes not to increase duty rates on Malayan canned pineapple, sago and tapioca. Malaya agrees not to impose duties on New Zealand products which are now free of duty, nor to increase the present duties on butter and cheese.

Phytotron for Australian sugar research

A phytotron, a factory for setting up synthetic weather conditions, is being built at Brisbane in order to help the sugar industry in Australia and Fiji. Research will be directed to how sugar cane makes and stores sugar, and advantages of the phytotron are that it can provide ways of varying many conditions and making numerous experiments quickly.

Vietnam sugar plants

An official review of the industrial situation of 1960 reports that there are 400 sugar plants throughout Vietnam, producing 32,000 tons of black sugar slabs a year. Production has still not satisfied domestic requirements however, and the government imports raw sugar from Cuba, Java and Taiwan.

Rice-processing factory for Dominican Republic

A rice-producing factory is under construction in the Dominican Republic. The rice industry has developed during recent years so that instead of being an importer, the republic is now one of the largest exporters in the Caribbean area.

Heinz bid for continental market

A holding company has been formed at Geneva by H. J. Heinz International, who have also acquired a factory at Elst in Holland to make sauces and soups. An agreement has also been concluded for the German Nadler group to be Heinz's German agents.

" . . . and this is the works swimming pool."

New Hungarian milk instrument

An instrument measuring the food value of milk, to be employed in dairy farms, has been developed in Hungary's University of Agricultural Science.

Pectin from guava; Indian discovery

Pectin, the soluble jelling carbohydrate, has been found to be present in guavas, which are abundant in India, where citrus peel and apples, the greatest source of pectin, are in inadequate supply.

Nigerian flour mill

An Italian company has been reported to be planning a flour mill at Port Harcourt. The mill will have a capacity of 50,000 tons of flour a year.

Japanese sugar contract

Japan will buy 100,000 tons of raw sugar from Queensland, Australia, between July, 1961, and January, 1962.

Czech food industry to expand

During the coming period 1961-1965 more than 200 processing plants will be built or reconstructed in Czechoslovakia, it is reported. Fifteen large combines, some new and some remodelled, will come into use, where meat can be processed from the slaughtering to sausage manufacture and the packaging of cuts for self-service shops. Also on the list are eight new and two reconstructed plants for sorting and processing eggs and cleaning and packing poultry; four canneries; and four frozen-foods plants.

New Zealand anglers' concern

Anglers in Mercury Bay have been concerned by approaches made to them by a canning company wishing to buy samples of tuna for canning experiments.

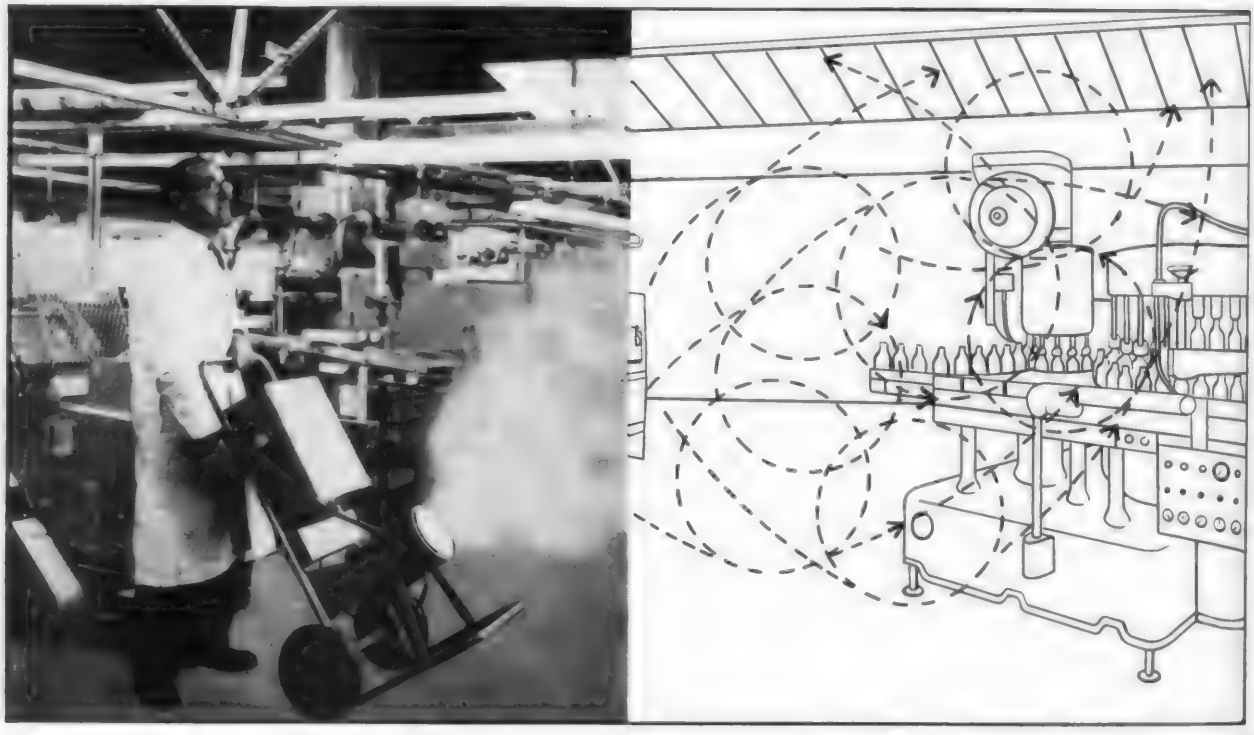
Kariba weeds for human consumption?

The Kariba Lake Co-ordinating Committee has asked scientists to test a weed, which is threatening to choke parts of Lake Kariba, for the extraction of protein as a human food. Investigations for the use of the weed as cattle food or fertiliser are also being carried out.

POSITIVE PEST CONTROL

completed in minutes by FREQUENT FOGGING

using your own equipment and safe insecticides



Disinfestation of manufacturing areas, warehousing, canteens and kitchens has been, until now, a *costly* and *disrupting* business. Today, using MICROSOL, with PYTHON non-tainting, non-toxic insecticides, you can actually carry out the work *without slowing production* or causing inconvenience to your staff.

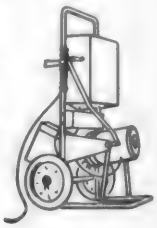
During a break period or last thing at night, one member of your staff operates the Microsol fog generator, filling the whole area with a high-turbulence mist that finds its way onto every exposed surface, and creeps into even the smallest cracks, leaving a thin residual film. PYTHON pyrethrum-based insecticides, well-known for rapid knock-down, complete the process of disinfestation safely, positively and economically. PYTHON is available in a range to cover every purpose.

The job is done in minutes. The capital outlay is negligible and one demonstration is sufficient training for the operator. You can repeat the process as often as you like to suit your own specific needs.

The Microsol mechanical fog generator is available in two sizes:

303T: weighing 75 lb. and wheel-mounted, for complete penetration of areas up to 300,000 cu. ft.

202: weighing 12 lb. and hand-operated, for complete penetration of areas up to 25,000 cu. ft.



Hard to believe? Many leading companies have already proved the positive effect of the Python/Microsol technique.

*MICROSOL mechanical fog generators with *PYTHON insecticides

based on African Pyrethrum

We invite you to see Python/Microsol in action. A technical representative will call with full details, at any time to suit you, and can give an on-the-spot demonstration at your premises.

* *Registered Trade Marks.*

AFRICAN PYRETHRUM

Contact: SILVER CREEK PRECISION LIMITED
17 Willow Road, Poyle Estate, Colnbrook, Bucks
Telephone: Colnbrook 2587/8

PEOPLE

SIR MILES THOMAS has been appointed a director of P. Leiner and Sons, Ltd.

•

MR. A. A. MORGAN, assistant managing director, sales and marketing services, resigned from the board of the H. J. Heinz Co. with effect March 31 on medical advice. His position has been taken by MR. A. BERESFORD. From the same date MR. L. E. SULLIVAN becomes general manager, manufacturing. It is not the company's intention to fill Mr. Sullivan's former position of general manager, factories.

Three product general managers have been appointed by the H. J. Heinz Co.

MR. J. A. CONNELL, formerly controller of the company, becomes product general manager—soups. He has been with the company 22 years.

MR. P. H. GRAY recently joined Heinz to become product general manager—beans and spaghetti. He was previously for 10 years with J. Lyons and Company, Ltd.

MR. W. WALKER, formerly marketing manager, is appointed product general manager for all other varieties. He joined the company in 1937.

Mr. A. A. Morgan

Mr. J. A. Connell

MR. J. F. ANSETT, MR. L. H. ALLEN, MR. H. H. HOLCOMB, MR. P. J. HOW, MR. D. B. PEARSE have been appointed directors of Armour and Co., Ltd., following the retirement of MR. J. L. MCCOWAN, MR. S. SHAW and MR. E. F. WILLATS.

•

MR. LESLIE SMITH, technical director of the Flour Milling Division of Thomas Robinson and Son, Ltd., has resigned from the board of the company. He will, however, be continuing his association in a consultative capacity.

•

DR. P. H. SYKES, M.SC., PH.D., F.R.I.C., M.I.CHEM.E., director of research and development of the Reed Paper Group, has been appointed deputy managing director of Albert E. Reed and Co., Ltd.

MR. JOHN S. SMITH and MR. B. B. FORDHAM, A.M.I.MECH.E., have joined the board of Ultrasonics, Ltd.

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MR. P. W. SELIGMAN has been appointed deputy chairman of the A.P.V. Co., Ltd., while retaining his present position of managing director, and MR. H. P. N. BENSON has also been appointed managing director.

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MR. D. BURNS has joined Glenville's, Ltd., and will work on product research at their Greenwich factory.

Mr. W. Walker

Mr. P. H. Gray

MR. R. H. WILKINS, a joint managing director of Baker Perkins, Ltd., has been appointed managing director, of Rose Brothers (Gainsborough), Ltd. He will remain a member of the board of Baker Perkins and will divide his time between the two companies.

MR. A. I. BAKER, chairman of Baker Perkins, MR. N. MOUNTAIN, director, and MR. W. A. B. BROWN, deputy managing director of the Forgrove Machinery Co., Ltd., have also joined Rose Brothers' board.

MR. H. S. RIDLEY, who will continue as chairman of Rose Brothers, has joined the board of the Forgrove Machinery Co.

•

MR. J. H. DEX, technical director of Thomas Robinson and Son, Ltd., has retired from the board of the company but will continue his association as a consultant. New appointments to the board are MR. J. C. GRAHAM and MR. D. W. POVEY.

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MR. D. W. BRAMLEY has been appointed selling agent in London and the Home Counties for N. Kilvert and Sons, Ltd.

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MR. H. W. VERNON, B.SC., F.R.I.C., technical director of W. J. Bush and Co., Ltd., retired on February 28 after 45 years' service with the company. His place on the board has been taken by MR. J. F. G. WYNNE, B.SC.

Mr. J. A. Croft

Sir Arthur Croft

MR. JOHN ARTHUR CROFT, deputy chairman and managing director of Crofts Engineers (Holdings), Ltd., has now been appointed chairman of that company and its principal operating subsidiary companies, including Crofts (Engineers), Ltd., and Carter Gears, Ltd.

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MR. B. A. HOLDEN, previously divisional manager, North London, for T. Wall and Sons (Ice Cream), Ltd., has been appointed company sales controller to succeed the late MR. W. L. MCCARTHY.

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DR. P. BATESON, who was previously medical officer of the company, has been appointed personnel manager of T. Wall and Sons (Meat and Handy Foods), Ltd. He succeeds MR. ERIC KEEGAN who moves to a similar post with Mac Fisheries, a sister company in the Unilever Group.

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Mr. N. W. Evamy

We regret that the picture on p. 85 of our February issue captioned "Mr. H. D. Rainbow" was in fact a photograph of Mr. N. W. Evamy, managing director of Three Cooks, Ltd., who has been elected deputy chairman of the Southern Regional Council of the Federation of British Industries.

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Obituary

SIR OLIVER LYLE, vice chairman of Tate and Lyle, Ltd., died in London on February 21, at the age of 70.

He joined Abram Lyle and Sons in 1912 and was appointed to the board in June, 1919. On the amalgamation in 1921 of Henry Tate and Sons and Abraham Lyle he became a managing director and was made a vice-chairman from October 1, 1958.

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SIR ARTHUR CROFT, chairman of Crofts Engineers, (Holdings), Ltd., died at his home, Buckstone Hall, Rawdon, near Leeds, at the age of 74. He joined the business as an apprentice in 1887 sixteen years after it had been founded by his father on a capital of £50.

Recent Patents

COMPLETE SPECIFICATIONS ACCEPTED

862,616. G. E. FINDLEY and W. B. NEWSOME: Process for yeast-leavened baker product and compositions therefor.
862,904. ROSE BROS. (GAINSBOROUGH), LTD.: Heat-sealing devices for wrapping or packaging machines using heat sealing materials.
863,181. BAKER PERKINS, LTD.: Manufacture of hard candy.
863,095. ARMOUR AND CO.: Packaging of fresh meat and poultry.
859,513. MARSHALL'S TEA MACHINERY CO., LTD.: Tea rolling apparatus.
859,983. A. E. HATTON (trading as PERFECTION STERILISER CO.): Sterilisation of milk.
859,454. M. STEMMER: Method of improving the baking qualities of rye and wheat flour.
859,882. NATIONAL RESEARCH DEVELOPMENT CORPORATION: Manufacture of cheese.
859,405. KEK, LTD.: Apparatus for mixing materials and producing a free flowing mixture.
859,974. HAAGSE BAKKERIJMACHINEFABRIEK A. KALMEIJER N.V.: Machines for moulding dough pieces for small bread.
859,722. PNEUMATIC SCALE CORPORATION, LTD.: Carton blank feeding apparatus.
859,383. R. D. GOROZPE: Extrusion apparatus for preparing food products.
860,129. H. A. H. CROWTHER: Means for cartoning flexible bags of liquid.
860,240. UNILEVER, LTD.: Beverages.
860,154. VEREINIGTE BACKEREIMASCHINENWERKE VEB.: Rolling device for dough.
860,803. A. E. LUETZOW: Method of and apparatus for cutting tubular stock of thermoplastic material in the manufacture of bags or like containers.
860,745. T. SYMINGTON AND CO., LTD.: Tea concentrates.
860,666. ELDORADO ICE CREAM CO., LTD.: Apparatus for the production of frozen confections.
860,594 METAL BOX CO., LTD.: Manufacture of bottles from thermoplastic materials.
860,723. CONCH INTERNATIONAL METHANE, LTD.: Low temperature refrigeration.
860,946. O. R. GROVES, LTD.: Manufacture of foodstuffs, beverages and the like.
861,117. M.P.P. (PRODUCTS), LTD.: Production of dehydrated mashed potato.
861,016. UNILEVER, LTD.: Cocoa-butter substitutes.
861,195. CORN PRODUCTS CO.: Production of hydrolysed starch syrups.
860,892. E. KOMM: Process for the production of beer or other fermented beverages.
860,894. SPEZIAL TECHNIK ET: Method and machine for preparing coffee extract.
861,182. P. GENNARI: Machine for the quick preparation of large quantities of high-grade coffee drink.
861,343. CONTINENTAL CARBON CO.: Bag-filling and handling machine.
861,082. LEYBOLD - HOCHVAKUUM - ANLAGEN G.M.B.H.: Apparatus and a method for freeze drying substances.
860,967. R. L. D. E. HENRY: Method and apparatus for shelling cashew-nuts.
864,341. HARVEYS BELGRAVIA FOODS, LTD.: Fruit canning.
864,339. A.Y. (ENGINEERS AND CONTRACTORS), LTD.: Method and means for moulding cheese.
864,372. J. G. GARDENER: Frost damage protection devices for orchards.
864,758. F. G. KEITEL: Preservation of fruit juices.
865,562. AJINOMOTO KABUSHIKI KAISHA and SANRAKU SHUZO KABUSHIKI KAISHA: Process for production of seasoning materials containing glutamic acid.
864,563. A. C. BILLINGHAM: Apparatus for manufacturing ice confections.
864,564. A. C. BILLINGHAM: Apparatus for manufacturing ice confections.
864,567. BORG-WARNER CORP.: Ice-making machine.
864,568. BORG-WARNER CORP.: Ice-making machine.
864,401. COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION: Cheese-curd fusing machine.
864,861. MASSEY - FERGUSON (U.K.), LTD.: Harvesting machines.
865,240. ROSE, DOWNS AND THOMPSON, LTD.: Method of treating fish skins.
865,077. SCHWEIZERISCHE INDUSTRIE G.M.B.H.: Packing machine.
864,965. GENERAL MOTORS CORP.: Method of making refrigerator cabinets.
865,199. AUTOMATIC CANTEEN CO. OF AMERICA: Brewing apparatus for coffee.

New patents are from the Journal of Patents. Permission to publish has been given by the Controller of Her Majesty's Stationery Office. The publication is obtainable from the Patents Office, 25, Southampton Buildings, London, W.C.2.

New Companies

Galaxy Chocolate, Ltd. (676046.) Barclays Bank Building, Hamilton Road, Slough, Bucks. £100. Dirs.: Colin E. Pratt and Ernest L. Halliwell.

Parkwood Universal Supplies, Ltd. (676470.) Bank Buildings, 4, Tuesday Market Place, Kings Lynn. To carry on bus. of mnfrs. of and dlrs. in catering equipment, food preparation machinery, etc. £1,000. Dir.: Peter Horsfall.

Oven Fresh Foods, Ltd. (676557.) Ovenfresh Food Factory, Holborn Street, St. Judes, Plymouth. £2,600. Dirs.: Gordon K. Lewis and Mrs. M. M. Lewis.

Refa (Great Britain), Ltd. (676560.) To carry on bus. of mnfrs. of materials and components used in packing and protection of produce, etc. £1,000. Dirs.: Arthur L. Cooney, Floris E. Vos and Maurits Henny.

Kennington Dairies, Ltd. (676705.) "Courtfield," 247, Faversham Road, Kennington, Ashford, Kent. To take over bus. cd. on as "Kennington Dairies" at Faversham Road, Kennington, near Ashford, and at Kingsnorth Road, Ashford, Kent, etc. £10,000. Dirs.: James E. Hood and Mary N. Hood.

Jaka Ham Company, Ltd., (677162.) Corinthian Buildings, 14-20, South Castle Street, Liverpool, 1. £100. Dirs.: Karl K. Z. Holst, Knud B. U. R. Johannesen and Wm. M. Pedersen.

M. R. Corfield and Co., Ltd. (677229.) 12, Botolph Lane, E.C.3. To carry on bus. of importers, blenders and packers of tea, etc. £1,000. Dirs.: Mervyn R. Corfield and Francoise A. Corfield.

C. W. Scannell, Ltd. (677382.) 159, Stoke Newington High Street, London, N.16. To carry on bus. of mnfrs. of and dlrs. in foods, etc. £1,000. Dirs.: Chas. W. Scannell and Mrs. Dorothy M. Scannell.

Kenipak Prepacks, Ltd. (677468.) Main Street, East Ardsley, near Wakefield. To carry on bus. of pre-packers of potatoes, vegetables, fruit, poultry and foodstuffs of all kinds, etc. £5,000. Dirs.: Richard Townsley, Gerald Townsley, Richard K. Townsley and Mary Townsley.

Green Plastic Packaging Co., Ltd. (677503.) Raynesway, Derby. £100. Dirs.: John V. Green and Wilfred N. Green.

International Freeze Dry, Ltd. (677540.) Lion House, 72, Red Lion Street, W.C.1. To carry on bus. of mnfrs. of and dlrs. in dehydrated products, etc. £10,000. Dirs.: Edward Hack and Miss Diana H. P. Hack.

Wiggshells, Ltd. (677659.) 135-7, Cheapside, London, E.C.4. To carry on bus. of egg packing, etc. £5,000. Subs.: Leslie J. Miller and Eric Watts.

West Lancashire Poultry Packers, Ltd. (677798.) 352, Manchester Road, Westhoughton, Lancashire. £1,000. Dir.: Doreen M. Rushton.

Meat and By-products Company (London), Ltd. (677833.) £100. Subs.: Marion Wix and Kathleen Sellers.

X.L. Home Bakery, Ltd. (678090.) Market Street, Heckmondwike, Yorkshire. £1,000. Dirs.: Wilfred Nield and Alan G. Clarke.

Felix Pure Foods, Ltd. (678154.) To carry on bus. of canners and packers of provisions, foodstuffs, etc. £100. Subs.: Malcolm Scott and Martin M. Shannon.

Goodman Holdings, Ltd. (678175.) To carry on bus. of confectioners, bakers, etc. £300. Subs.: John B. Goodman and Mrs. P. Goodman.

Robert Smith (Poultry Packers), Ltd. (678202.) Rose Cottage, Eppleby, Richmond, Yorkshire. £1,000. Dir.: Robert Smith.

G. Woosey and Son, Ltd. (678259.) 65, Market Street, Heywood. To carry on the bus. of bakers, pastrycooks, flour millers, etc. £1,000. Dirs.: George Woosey and Mrs. Edith Woosey, Colin Woosey and Mrs. Mary I. Woosey.

H. E. Pringle, Ltd. (678261.) To carry on the bus. of dlrs. in barley, corn, maize, rice, wheat and other cereals, etc. £100. Dirs.: Harry E. C. Pringle, Gordon B. Wood and Michael G. Drakeford.

Holloway Containers, Ltd. (678263.) Bessemer Road, Welwyn Garden City, Herts. £1,000. Dirs.: Albert R. Holloway, Harold S. Holloway, Donald C. Cann and Joseph W. Turner.

Mountain Meat Company of Wales, Ltd. (678351.) £100. Subs.: Philip Howard Baker, Farmers' Marts (R. G. Jones), Ltd.

These particulars of new companies recently registered have been extracted from the daily register of Jordan and Sons, Ltd., Company Registration Agents, 116, Chancery Lane, London, W.C.2.

"Coming home to Campbell's. That means he's coming home to soup made the Campbell way."

Campbell's choose butter...

TO SELL THEIR GREEN PEA SOUP

"Today, Campbell's Green Pea Soup—smooth and satisfying because it's made with butter . . ."

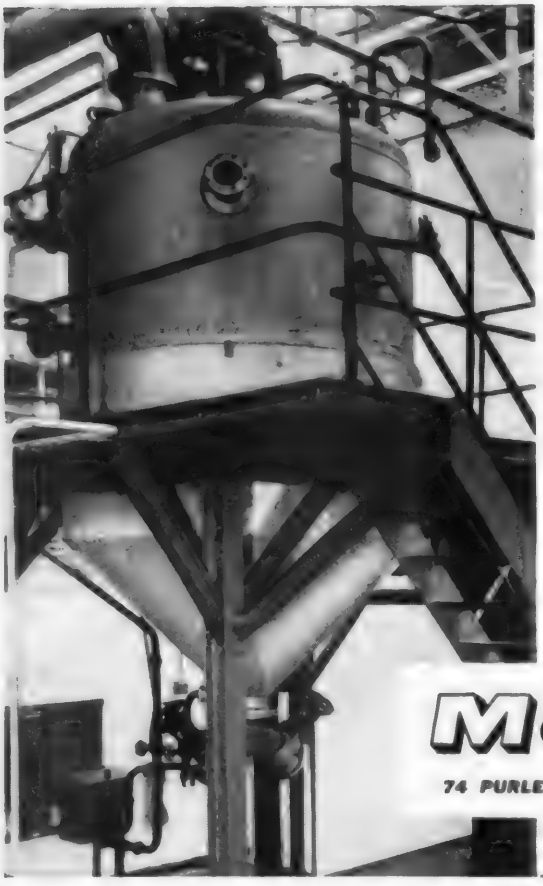
WHY HAS CAMPBELL'S recent return to the British market been such a success? Well, to start with, the soups themselves. "To make the best, begin with the best," say Campbell's. So it's not surprising to find that Campbell's enrich many of their soups with butter.

And Campbell's advertising dramatizes the extra goodness in the soups. Take this latest television commercial: "Today, Green Pea Soup — smooth and satisfying because it's made with *butter*."

That word butter was chosen very deliberately. Campbell's, like so many other manufacturers today, know that butter really sells the goods. So if up to now you have hesitated to put butter in your products, think again. There's real selling power in a product made with butter.

"...a wonderful way to serve more of the good, nourishing foods we all need."

ISSUED BY THE BUTTER INFORMATION COUNCIL
Mercury House, Waterloo Road, London, S.E.1
Telephone: WATerloo 5231



Quality plant for quality food

Soundness of design and first class workmanship are self-evident in this view of a steam jacketed stainless steel vacuum evaporator vessel of 1500 gallons capacity.

Many firms in the Food Industry, wanting stainless steel plant that will give them long trouble-free service, come to . . .

Metal Propellers Ltd

74 PURLEY WAY, CROYDON, SURREY • Phone: THORNTON HEATH 3611-6

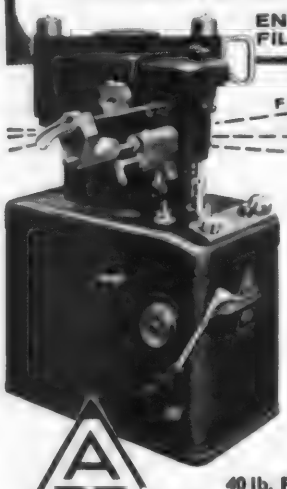
Photograph by courtesy of Oxo Ltd.

HP53

FILLING a great need

END LABORIOUS HAND FILLING OF SAUSAGES!

FAST OPERATION
ACCURATE WEIGHING
NO WASTAGE



At last sausage making is fully automatic. Just press a button on the A.B.R. filler linker and you can produce up to 200 sausages a minute! There's absolutely no wastage or contamination. No oil can reach the meat and there are no crevices for the meat to pass through. The machine is adjustable to suit any type of casing or sausage meat. An automatic holding device can be supplied for synthetic casings.

Anyone can operate or maintain the A.B.R. filler linker—it has automatic lubrication and only three grease nipples requiring once-monthly attention. Two sizes: 110 lb. and 155 lb.

40 lb. FILLER

Ideal for the small manufacturer. Takes hard, deep-cooled or soft sausage mixes. Knee-action lever for easy control. Single- or 3-phase motor.

A BR

Automatic
FILLER LINKER

Other machines include: BOWL CHOPPERS, MINCERS, BAND SAWS, FAT DISPENSERS, CLARIFIERS, ETC.

To AMASAL LIMITED, Butchers' Supplies Division, Caldwell Spice Mills, Nuneaton, Warwickshire. Tel: Nuneaton 4012

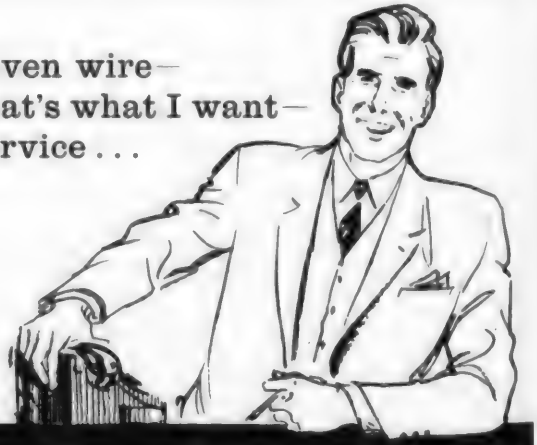
An Amasal Company

Please send full details of the A.B.R. AUTOMATIC FILLER LINKER without obligation to:

NAME..... ADDRESS.....

Please tick size req'd. 155 lb. ☐ 110 lb. ☐ 40 lb. ☐ F.M.

Woven wire—
that's what I want—
service . . .



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where wire is woven in any mesh,
any metal for any purpose—
as perfect as a century of experience can make it.

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Mancuna-Dustex Collectors being assembled at our Denton Works.

PROFITABLE

dust control

WITH THE

MANCUNA-DUSTEX

COLLECTOR

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- Economical separation of dust from normal or high temperature gas or air.
- Revolutionary new unit-cast design.
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- Handles sticky materials.
- No condensation or plugging.
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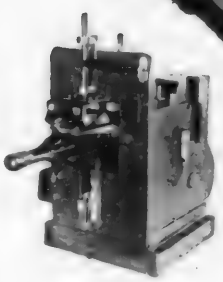
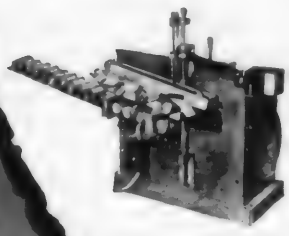
LABELLING AND PACKAGING EQUIPMENT



SEMI-AUTOMATIC LABELLING MACHINE BENCH MODEL A

For all shapes of labels and bottles.



AUTOMATIC LABELLING MACHINE BENCH MODEL B

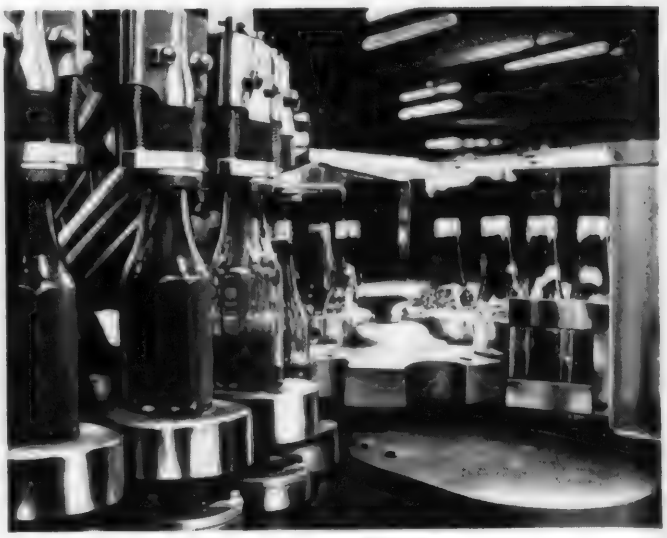
Gums and applies labels to cylindrical objects.

NEWMAN LABELLING MACHINES LTD., QUEENS ROAD · BARNET · HERTS Tel. BARnet 9866

CROSSE & BLACKWELL

rely on

ALBRO



Like so many important food manufacturers, Messrs. Crosse & Blackwell Ltd. depend on ALBRO automatic filling machines to maintain big, sustained output.
The ALBRO 24-head vacuum-operated machine illustrated is one of many installed at the Crosse & Blackwell factories. It shows bottles entering on the feed side for tomato ketchup filling.

ALBRO filling machines are utterly reliable; fill to exact level without spill, drip or mess; reject damaged bottles; are quickly and easily cleaned because the design is simple and all parts in contact with the product are made of stainless steel.

ALBRO filling machines are made in a wide range of capacities for handling liquids, semi-liquids, powders and pastes. Ask for details and a demonstration.

ALBRO Filling Machines for Liquids, Powders & Pastes

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No. 4 GRANULATOR

for moist or sticky powders prior to tableting etc.

* *Write for illustrated leaflet*

ROBUST & DURABLE—supplied with Stainless Steel parts where in contact with the material being granulated. Long life of the mesh is guaranteed.
EFFICIENT, DEPENDABLE, EASILY CLEANED—all parts working on the material being granulated can be easily and quickly dismantled without the use of spanners.
QUIET IN OPERATION—all gearing is enclosed in oil bath.

ALL USERS ARE HIGHLY DELIGHTED WITH THE PERFORMANCE AND CONVENIENCE OF THIS MACHINE

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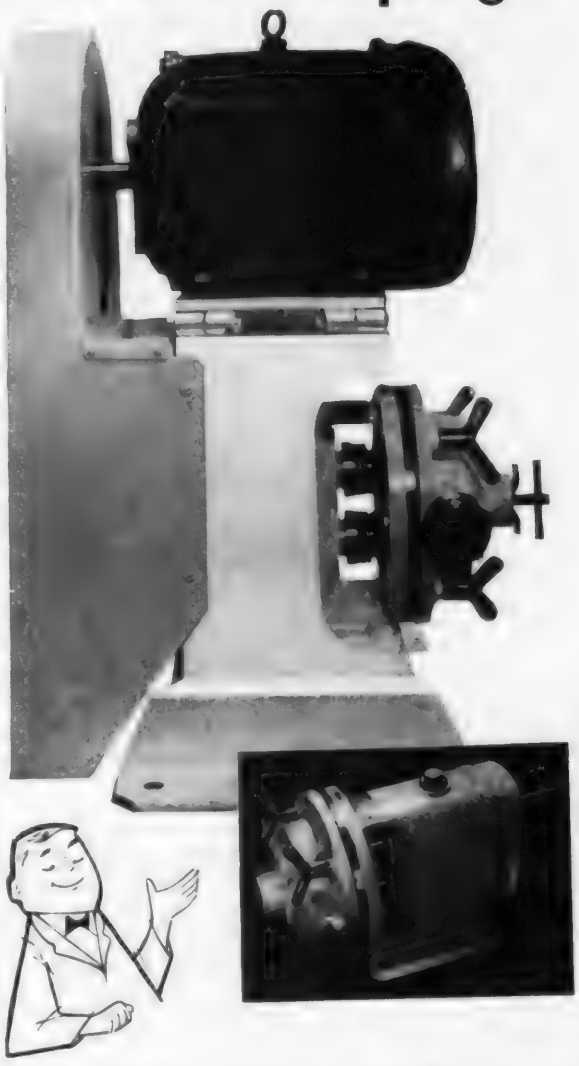
Clean Pumping



Stainless Steel R.E.C. Pumps are of the positive displacement type, designed specifically for the clean handling of all viscous and sticky products, as well as sensitive fluids and fluids of low viscosity.

In fact R.E.C. Pumps will handle almost any product capable of being pushed through a pipe.

F.M.B. 18/8/3 quality Stainless Steel is standard for R.E.C. Pumps. Rapid easy cleaning with exclusive features and a reasonable price make these Pumps (manufactured in five sizes with capacities up to 10,000 g.p.h. and for pressures up to 150 lbs./sq. in.) most suitable for the Food, Dairy, Brewing, Pharmaceutical, Chemical and Allied Industries.

Suction and discharge connections are screwed to suit customers requirments, glands can be of the normal stuffing box type or if preferred, Flexibox or Crane Mechanical Gland Seals.

Send for Technical Leaflet.

Concessionaires and stockists of R.E.C. Pumps in England, Scotland and Wales:
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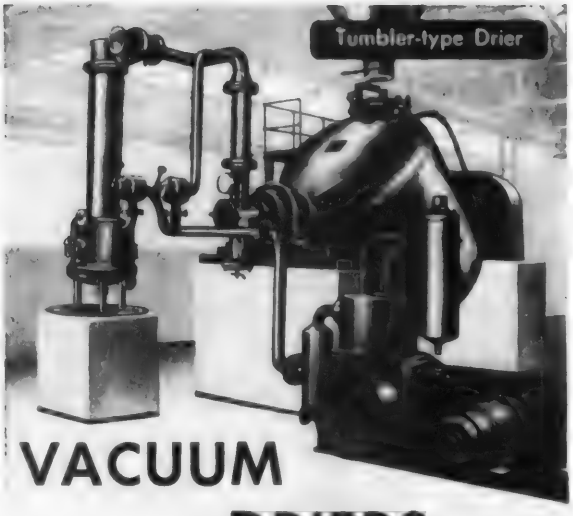
STAINLESS STEEL PUMPS LTD

Dept. Myrtle Road, EASTBOURNE, Sussex

Telephone: ***Eastbourne 6304***

Telegraphic Address: ***Staypumps, Eastbourne***



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Tumbler-type Driers · Freeze Driers
Single Drum and Double Drum Driers

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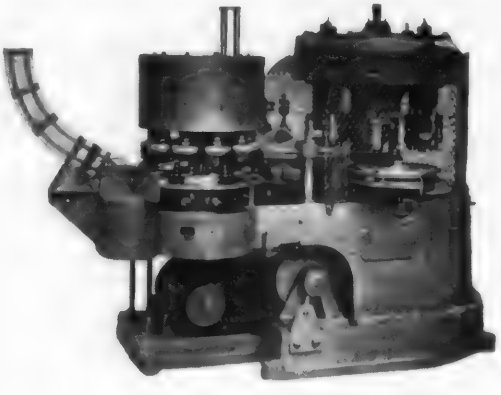
HIGH SPEED CLOSING MACHINE



Fully-automatic, 4-head turret type double-seaming machine for closing round cans up to 250 a minute.

Can be supplied with 10-head liquid filler as shown in illustration. Steam flow attachment also available.

Write for details of this machine and of our vacuumising and closing machines, turntable soldering machines for tagger lids and gas charging boxes.

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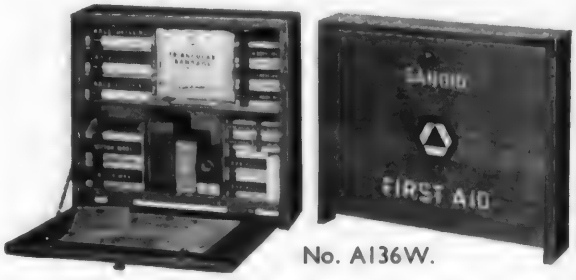
On January 1st 1960, revised First Aid regulations (S.I.1959 No. 906) became operative, affecting most factories.
Ensure that you are complying with the latest regulations by consulting us for all your First Aid requirements.



No. A136W.

Conforming to the requirements of S.I. 1959 No. 906 for factories in which the number of persons employed exceeds ten but does not exceed fifty.

A PRODUCT OF Cirkon, Gerrard & Co. Ltd OLDBURY, BIRMINGHAM

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Also available—Rozalex Fruit Stain Removing Cream.

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Keeps Hands HEALTHY

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10 to 50 quart models at competitive prices.

ATTRACTIVE HIRE PURCHASE TERMS ARRANGED IF REQUIRED.

"Duratax" Electric CAKE MIXERS

Other machines in the John Hunt range include 7, 14 and 28 lb. Potato Peelers: "Little Champion" Pie and Tart machines; Tongue Slicers; Power and Hand Paste Rollers; Bun Dividers, etc. Brochures always obtainable on request.

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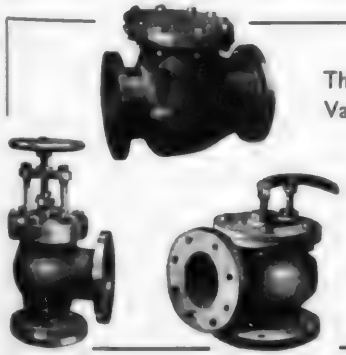
A DIAPHRAGM VALVE WITH A DIFFERENCE

Note these worthwhile features of this advanced design

- **Positive bonding of diaphragm and wedge**
- **Certain sealing WHENEVER closed**
- **Unrestricted flow passage**
- **Low head loss**
- **NO overstressing of diaphragm**
- **Available for a wide range of fluids**



There are many other Glenfield Valves.

From the complete selection can be met almost every requirement for controlling the flow of fluids, particularly water. Illustrated are examples of Check, Globe and Ball types.

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Permoglaze
THE TILE LIKE FINISH

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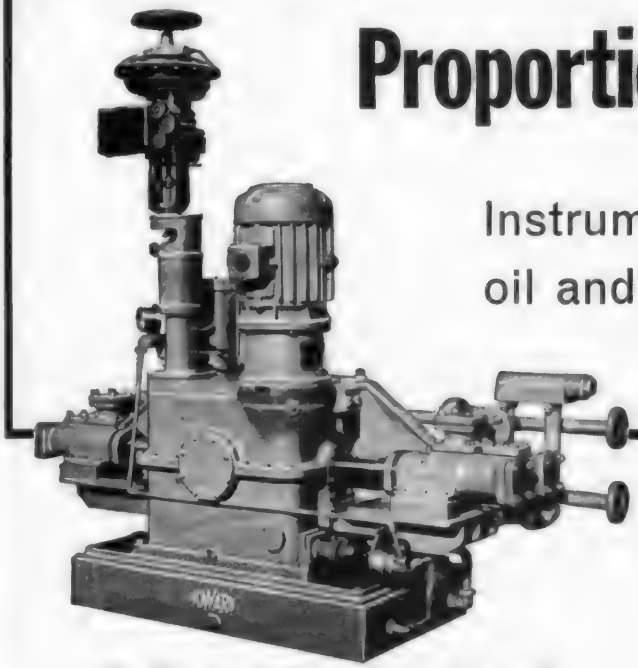
Rathbone

Proportiometer pumps

Instrument controlled for the oil and chemical industry



This illustration shows a 3 HL size double-ended pump, designed for a well-known oil refinery to pump hydrocarbons. It is fitted with instrument and ratio control for operating the output adjusting mechanism.

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BETTER FLAVOUR

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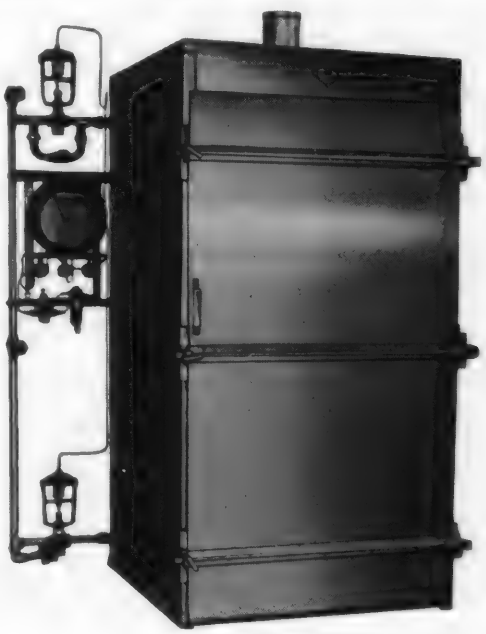

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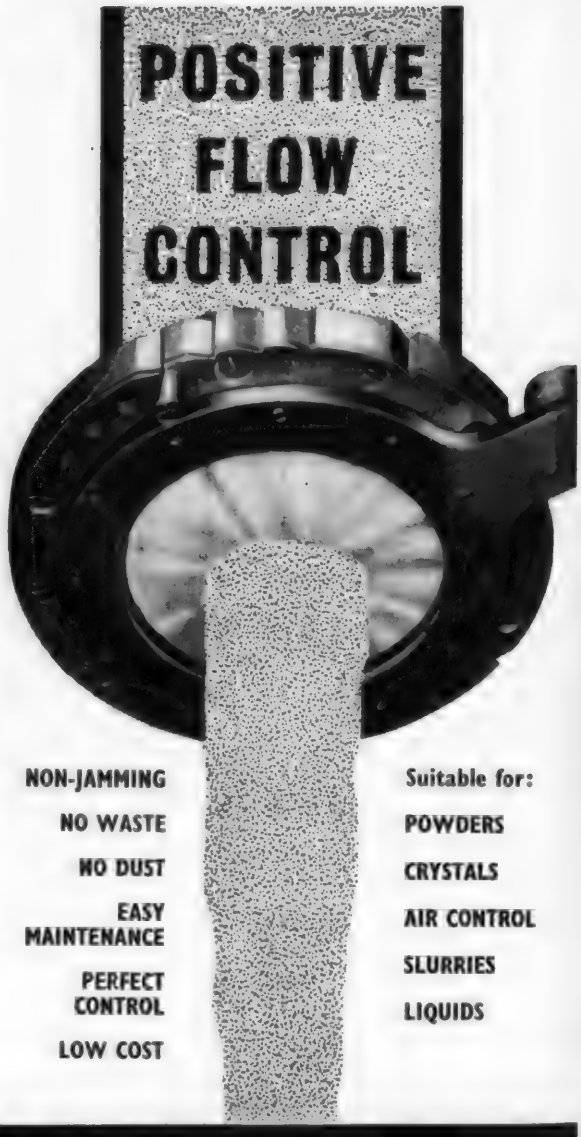

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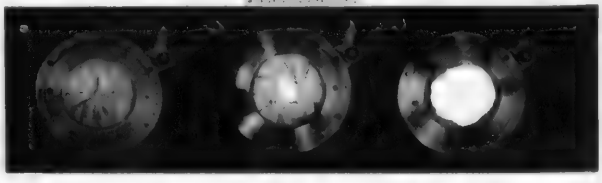

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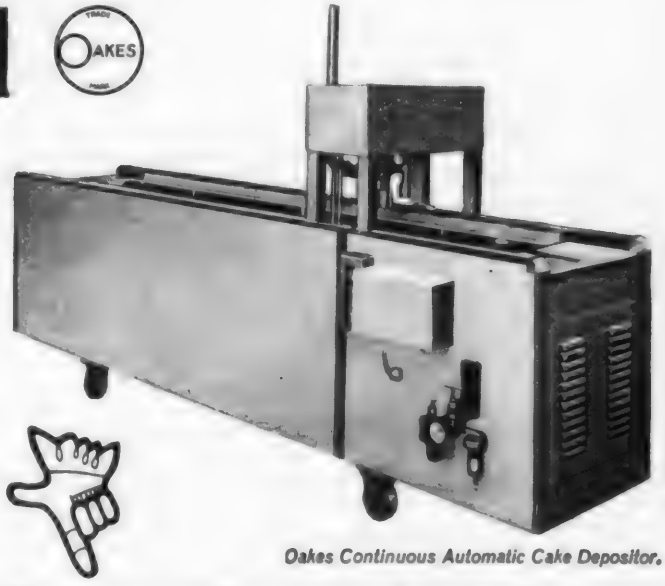

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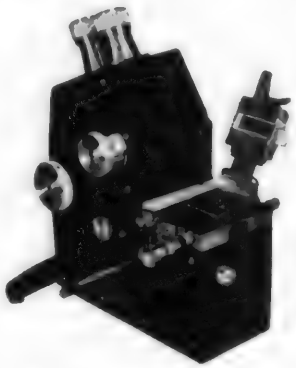

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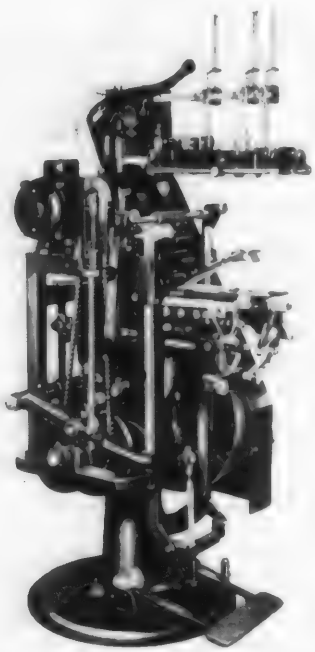

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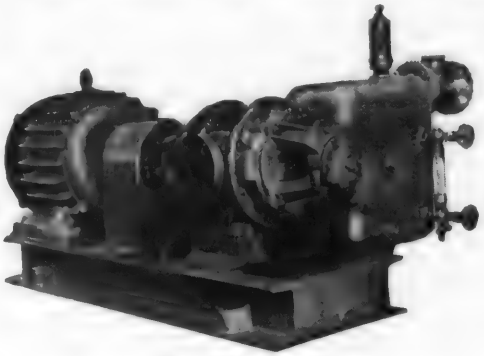

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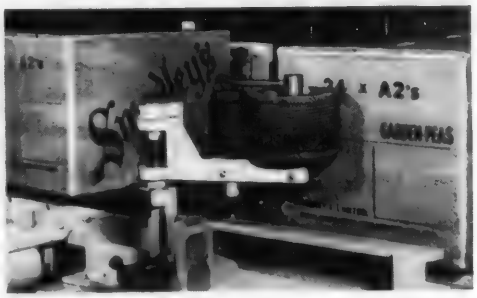

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Ref. B.214. British. Male. Married. Age 31. H.N.C. Mech. 3 yrs. Apprentice, transformer mnfrs. 6 yrs. Elect. Mech., R.N. 1 yr. Precision Fitter, elec. engrs. 4 yrs. Senr. Design D/man, mech. design engrs. At present Project Engr. i/c Projects Dept. of mech. handling engrs. Wide exper. precision mech. design & design of elec. & hydraulic control circuits, & specialised mech. handling projects (not bulk handling). Seeks post as **DESIGN OR PROJECT ENGR. (MECH. OR ELECTRO/MECH.).** London or N. London—Dunstable or Luton pref. £1,400/£1,500 p.a.

Ref. B.215. British. Male. Single. Age 32. H.N.C. (Mech.), Grad.I.Mech.E., Inter B.Sc., Stud.I.Chem.E. 2 yrs. Tech. Sales Asst., chem. mnfrs. 1½ yrs. Machinist, genl. engrs. 1 yr. Fitter, aluminium founders. 3 yrs. D/man, power station pipework & steelwork. 2½ yrs. D/man, chemical plant. 3 yrs. Director, mnfrs. agents. Seeks **TESTING OR MAINTENANCE OF CHEM. PLANT POST.** Greater London pref. £1,000 p.a.

Ref. B.216. Greek. Male. Married. **RESIDENT U.K.** B.Sc. (Pt. II) standard in Mech. Engg. Now taking H.N.C. Elect. U.K. exper. includes 1½ yrs. Design D/man, earth moving equipt. 1½ yrs. Senr. D/man, consultant contractors. 1 yr. D/man, furnace mnfr. At present Project Design D/man, electrical terminations. Seeks post as **PROJECT DESIGN D/MAN.** London, Richmond or West Middlesex. £980 p.a. min.

Ref. B.217. British. Male. Married. Age 47. A.M.Inst.W. 2 yrs. Apprentice, instrument makers. 4 yrs. Foreman, genl. engg. 21 yrs. Senr. Representative, technical liaison & sales on use of gases. 1 yr. Representative, high pressure controls. Seeks **TECHNICAL LIAISON OR SIMILAR POST.** London. £1,200 p.a. approx.

Ref. B.218. British. Male. Married. Age 53. A.C.G.I., A.M.I.Mech.E., A.M.I.E.E., M.I.Mar.E. Exper. includes 29 yrs. Senr. Executive Appointments, govt. depts. abroad, & as agent, representative, contract & inspecting eng. Exper. pressure vessels, boilers, power stations. Seeks post as **ELECTRICAL/MECH. ENGR.** Pref. abroad but U.K. considered. U.K. salary £1,500 p.a. min.

Ref. B.220. Polish. Male. Married. Age 30. **RESIDENT U.K.** H.N.D. Mech. Eng. 2 yrs. Graduate Apprentice & 2 yrs. Airflow Laboratory Asst. Engr., steam turbine engg. At present Devpt. & Test Engr., heating, ventilation & air conditioning. Consid. Design exper. on air ducts/piping/exhaust chambers. Seeks post as **DEVPT. & TEST ENGR. OR DESIGN ENGR.** London. £1100 p.a.

Ref. B.221. British. Male. Married. Age 41. O.N.C. (Elec.). 1 yr. Resident Engr., city council abroad. 2 yrs. Site (Construction) Electrical Engr. 6 yrs. Senr. D/man, electricity. 1 yr. Tech. Asst., county council. At present Contract Manager, mnfr. of control panels & electrical contractors. Seeks post **WITH STABILITY & "JOB SATISFACTION" AS CHIEF D/MAN/CONTRACTS ENGINEER/WORKS MANAGER.** E. or S. England, pref. with house.

Ref. B.222. British. Male. Single. Age 23. G.C.E. "A" Level Botany, Zoology & Chemistry Ph.C. 2 yrs. Apprentice & 1½ yrs. Relief Pharmacist, retail chemist. At present Relief Pharmacist, retail chemist. Seeks **TECHNICAL/TECHNICAL WRITING/ EDITORIAL OR PERSONNEL POST,** anything considered except retail or hospital work. £800/£850 p.a. approx.

Ref. B.223. British. Male. Single. Age 23. C. & G. Full Tech. Cert. 5 yrs. Apprentice, mech. engg., compressed air engrs. 1 yr. Project Mechanic, dust extraction. At present engaged in practical aspect of research & devpt. in dust extraction. Seeks **TECHNICAL ADVISORY/SUPERVISORY/DEVPT. POST.** Outer London. £13 per week.

Ref. B.224. British. Male. Married. Age 30. 4 yrs. Apprentice, genl. engg. 7 yrs. Engr., Fleet Air Arm. 4 yrs. Tech. Representative, aero engine mnfrs. At present Senr. Sales Engr., hydraulic/pneumatic engrs. Good exper. sales office admin. & procedures. Seeks **ENGINEERING SALES OR MANAGEMENT POST.** U.K.—S. England pref., or Canada or Australasia. £1,100/£1,250.

Ref. B.225. British. Male. Married. Age 26. S.2.S.1, & Maths. Engg. Drawing for M.O.T. 2nd Class Cert. 5 yrs. Apprentice Engr., genl. engrs. At present Marine Engr. Officer, shipping company. Seeks post as **D/MAN**, anywhere considered. £850 p.a.

Ref. B.226. British. Male. Single. Age 29. B.Sc. (Eng.). S.I.Mech.E. 4½ yrs. Systems Engr., aircraft & guided weapons. At present Stability & Control Aero Engr., aircraft design & research. 1½ yrs. research of "operational" nature & 6 mnths. course in O.R. Seeks post as **OPERATIONAL RESEARCH ENGR.** U.K. or abroad. £1,450 p.a.

Ref. B.228. British. Male. Single. Age 28. Credits in 1st & 2nd yr. O.N.C. (Elec.) with very high standard for tech. dwg. Now taking 3rd yr. 1 yr. Fitter's Mate, elec. engrs. 8 yrs. R.N. to P.O. Electrician. At present Prototype Electronic Wireman, nucleonics. Seeks post as **D/MAN/ENGR.—PREF. AUTOMATION.** London. £800 p.a.

Ref. B.229. British. Male. Married. Age 43. A.M.Inst.Eng. Inspection. 6 yrs. Examiner i/c, eng. tech. grade, govt. dept. 6 yrs. Inspector, m/c tool mnfr. 3 yrs. Inspector, electrical mnfrs. 3 yrs. Apprentice, airline company. At present Technical Assistant, oil company. Seeks **OUTSIDE INSPECTION OR EXPEDITOR POST.** Pref. London, but would travel in Provinces. £1,000 p.a. min.

Ref. B.230. British. Male. Married. Age 28. O.N.C. & H.N.C. Chem. Pt. I of Grad. R.I.C. 4 yrs. Lab. Assist., pharmaceuticals. 4 yrs. Analyst & 3 yrs. Asst. Head of Productivity, heavy inorganic chemicals. At present Prod. & Packaging Manager, ethical pharmaceuticals. Has had training in Work Study & exper. management & operator training. Seeks post as **PRODUCTION EXECUTIVE.** U.K.—pref. Manchester area. £1,250 p.a.

Ref. B.231. British. Male. Married. Age 55. M.I.Prod.E., M.Inst. Work Study. 5 yrs. Jig & Tool D/man, telephones. 1 yr. Tool Designer, radio. 12 yrs. Chief Tool D/man, cameras. 2½ yrs. Chief Engr. & 1½ yrs. Chief Prod. Engr., loudspeakers. 4 yrs. Works Manager, aircraft fuelling. At present Chief Planning Engr., automobile suspensions. Specialist on press work & single spindle autos. Seeks post as **PROD. ENGR.** U.K.—S. of the Wash. £1,750 p.a.

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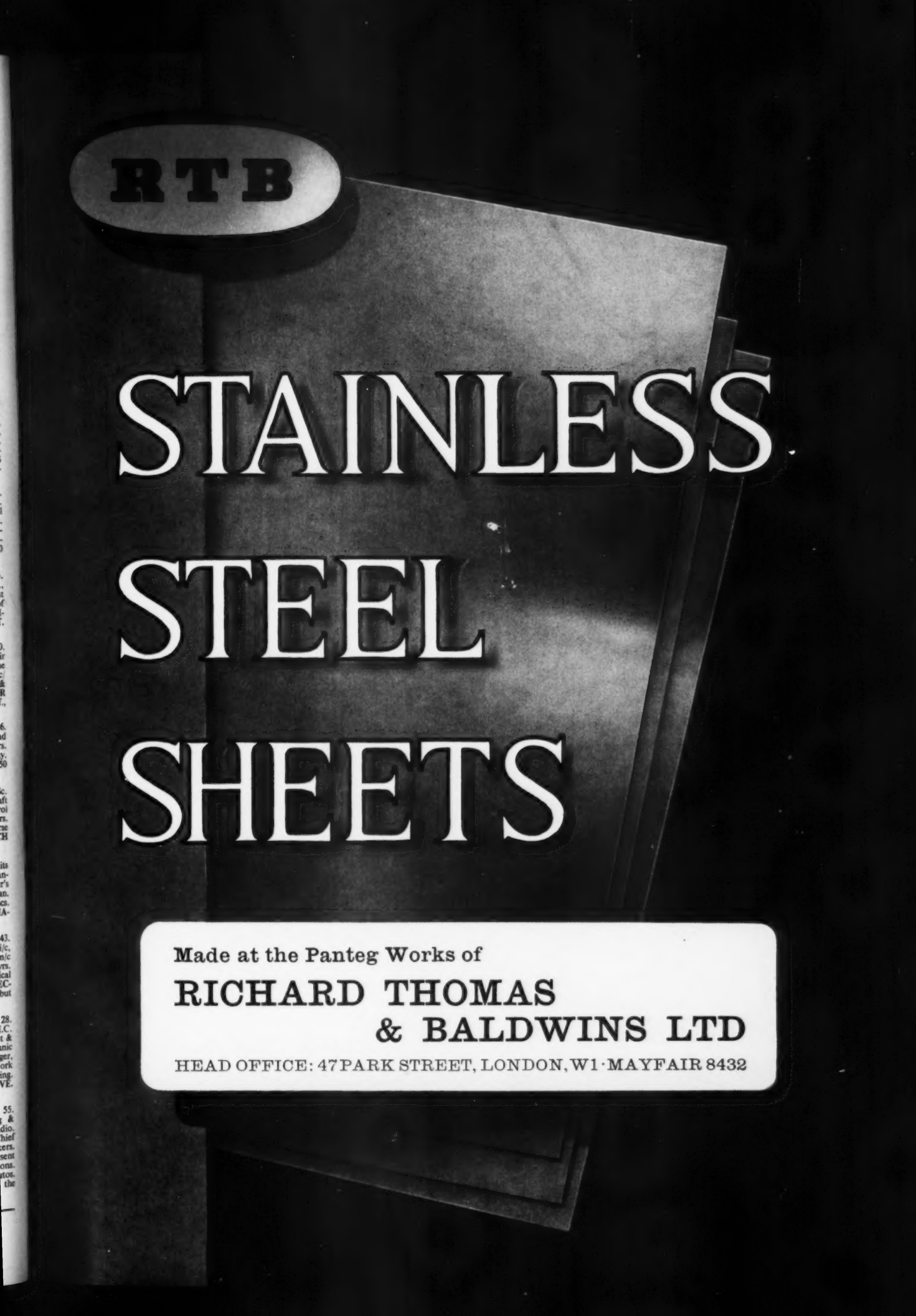
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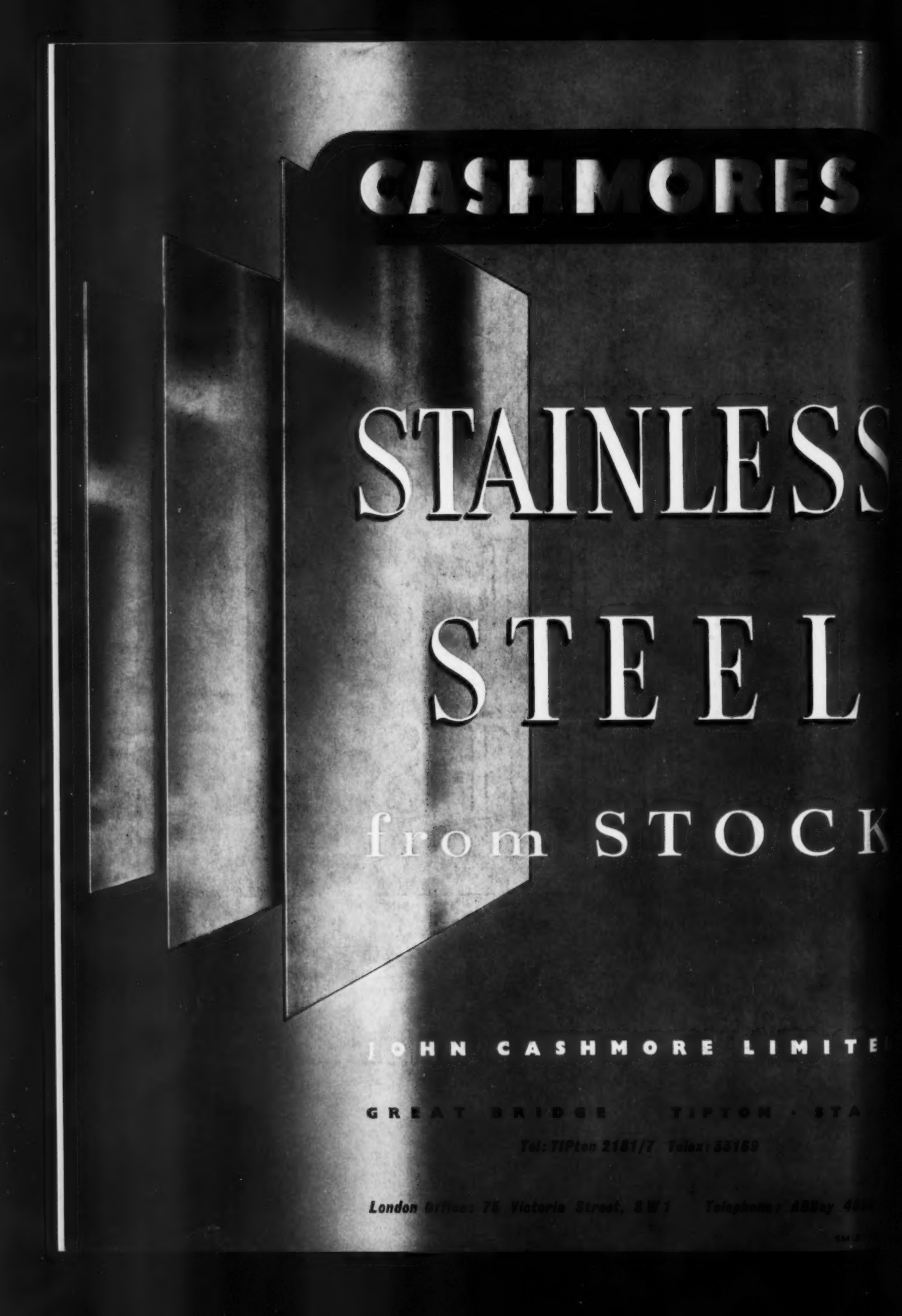
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